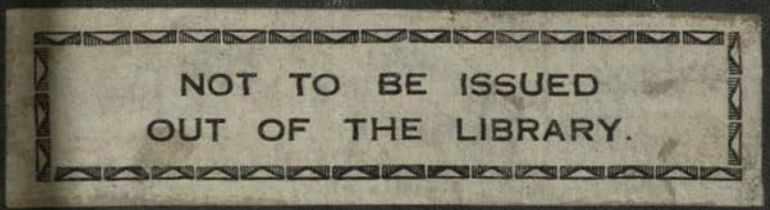
00055236


NOT TO BE ISSUED
OUT OF THE LIBRARY.

BOMBAY BRANCH
OF THE
ROYAL ASIATIC SOCIETY
TOWN HALL, BOMBAY.

Digitized with financial assistance from
Hemendra Kothari
on 06 November, 2019

THE FLOWERING PLANTS
GRASSES, SEDGES & FERNS
OF
GREAT BRITAIN

1. BRITTLE BLADDER FERN.
Cystopteris fragilis.

2. B. B. F.
VAR. C. angustata.

Vol. II

Pl. 297.

Frontispiece.

THE FLOWERING PLANTS
GRASSES, SEDGES & FERNS
OF
GREAT BRITAIN

AND THEIR ALLIES

THE CLUB MOSSES, HORSETAILS, &c.

By ANNE PRATT

55236

NEW EDITION
Revised by EDWARD STEP, F.L.S.

ILLUSTRATED WITH
THREE HUNDRED AND NINETEEN COLOURED PLATES
FIGURING
UPWARDS OF 1500 SPECIES

VOL. IV.

7x-f.46

LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

LONDON
FREDERICK WARNE & CO.
AND NEW YORK
1900

55236

00055236

CONTENTS.

VOL. IV.

(*Arranged according to generic names.*)

		Plate	Fig.	Page
Acorus calamus	Sweet Flag	239	2	21
Actinocarpus damasonium	Common Star-fruit	237	1	12
Adiantum capillus-veneris	True Maiden-hair	310		148
Agrostis alba	Marsh Bent-grass	260	1	68
canina	Brown Bent-grass	259	1	67
interrupta	Dense-flowered Silky Bent-grass	260	3	69
setacea	Bristle-leaved Bent-grass	259	2	67
spica-venti	Spreading Silky Bent-grass	260	2	68
vulgaris	Fine Bent-grass	259	3	68
Aira alpina	Alpine Hair-grass	261	2	70
cæspitosa	Tufted Hair-grass	261	1	69
canescens	Grey Hair-grass	262	1	70
caryophyllea	Silvery Hair-grass	262	2	70
flexuosa	Waved Hair-grass	261	3	70
præcox	Early Hair-grass	262	3	70
Alisma natans	Floating Water Plantain	237	3	12
plantago	Great Water Plantain	237	2	11
ranunculoides	Lesser Water Plantain	237	4	12
Allosorus crispus	Curled Rock-brake	284	2	114
Alopecurus agrestis	Slender Foxtail-grass	255	5	61
alpinus	Alpine Foxtail-grass	255	4	61
bulbosus	Tuberous Foxtail-grass	255	6	61
fulvus	Orange-spiked Foxtail-grass	255	8	62
geniculatus	Floating Foxtail-grass	255	7	61
pratensis	Meadow Foxtail-grass	255	3	60
Ammophila arundinacea	Common Sea Mat-weed	256	3	62
baltica	Baltic Sea-reed			64
Anthoxanthum odoratum	Sweet-scented Vernal-grass	255	1	59
Arrhenatherum avenaceum	Common Oat-like grass	263	3	72
Arum italicum	Roman Arum			20
maculatum	Cuckoo-pint	239	1	17
Asplenium adiantum-nigrum	Black Spleenwort	301	1	131
fontanum	Smooth Rock Spleenwort	301	2	132
germanicum	Alternate-leaved Spleenwort	302	2	134
lanceolatum	Green Lanceolate Spleenwort	300		130
marinum	Sea Spleenwort	303	1	135
ruta-muraria	Wall-rue Spleenwort	302	1	133
septentrionale	Forked Spleenwort	302	3	134
trichomanes	Common Wall Spleenwort	304		136
viride	Green Spleenwort	303	2	135
Athyrium filix-fœmina	Lady-Fern	305		136
Avena fatua	Wild Oat	273	1	88
flavescens	Yellow Oat	274	3	89
planiculmis	Flat-stemmed Oat	274	1	89

		Plate	Fig.	Page
Avena pratensis	Narrow-leaved Perennial Oat	273	3	89
pubescens	Downy Oat	274	2	89
strigosa	Bristle-pointed Oat	273	2	88
Blechnum boreale	Northern Hard-Fern	308		142
Blysmus compressus	Broad-leaved Blysmus	245	4	38
rufus	Narrow-leaved Blysmus	245	5	38
Botrychium lunaria	Common Moonwort	314	1	156
matricariæfolium	Chamomile-leaved Moonwort			157
Brachypodium pinnatum	Heath False Brome-grass	277	2	95
sylvaticum	Slender False Brome-grass	277	1	94
Briza media	Common Quaking-grass	268	2	80
minor	Small Quaking-grass	268	3	81
Bromus arvensis	Taper Field Brome-grass	272	2	87
asper	Hairy Wood Brome-grass	270	2	85
commutatus	Tumid Field Brome-grass	271	4	86
diandrus	Upright Annual Brome-grass	270	3	86
erectus	Upright Brome-grass	270	1	85
maximus	Great Brome-grass	271	2	86
mollis	Soft Brome-grass	271	5	87
patulus	Spreading Brome-grass	272	3	87
racemosus	Smooth Brome-grass	272	1	87
secalinus	Smooth Rye Brome-grass	271	3	86
squarrosus	Corn Brome-grass	272	4	87
sterilis	Barren Brome-grass	271	1	85
Butomus umbellatus	Flowering Rush	236	8	10
Calamagrostis epigejos	Wood Small-reed	258	1	67
lanceolata	Purple-flowered Small-reed	258	2	67
stricta	Narrow Small-reed	258	3	67
Carex acuta	Slender-spiked Sedge	251	9	41
ampullacea	Slender-beaked Bottle Sedge	254	8	52
aquatilis	Straight-leaved Water Sedge	251	8	47
arenaria	Sea Sedge	250	9	44
atrata	Black Sedge	251	5	47
axillaris	Axillary-clustered Sedge	250	1	45
binervis	Green-ribbed Sedge	252	7	49
bœnninghauseniana	Bœnninghausen's Sedge	250	2	45
canescens	Hoary Sedge	251	4	47
cæspitosa	Tufted Bog Sedge	251	10	48
capillaris	Dwarf Capillary Sedge	253	1	50
chordorrhiza	Cord-rooted Sedge			48
clandestina	Dwarf Silvery Sedge	254	3	52
collina	Mountain Sedge	254	1	50
curta	White Sedge	249	10	44
davalliana	Prickly Separate-headed Sedge	249	3	43
depauperata	Starved Wood-Sedge	252	11	50
digitata	Fingered Sedge	254	4	52
dioica	Creeping Separate-headed Sedge	249	2	43
divisa	Bracteated Marsh Sedge	251	2	46
distans	Loose Sedge	252	6	49
divulsa	Grey Sedge	250	7	46
elongata	Elongated Sedge	249	12	44
ericetorum	Heath Sedge			51
extensa	Long-bracteated Sedge	252	3	48
filiformis	Slender-leaved Sedge	254	6	52
flava	Yellow Sedge	252	4	48
fulva	Tawny Sedge	252	5	49
glauca	Glaucous Heath Sedge	253	9	50
hirta	Hairy Sedge	254	7	52
incurva	Curved Sedge	249	7	44
intermedia	Soft Brown Sedge	251	1	46
lævigata	Smooth-stalked Beaked Sedge	252	8	49

		Plate	Fig.	Page
Carex leporina	Hare's-foot Sedge	249	11	44
limosa	Mud Sedge	253	3	50
muricata	Greater Prickly Sedge	250	8	46
ovalis	Oval-spiked Sedge	249	8	44
pallescens	Pale Sedge	252	2	48
paludosa	Lesser Common Sedge	254	10	53
panicea	Pink-leaved Sedge	252	9	49
paniculata	Great Panicled Sedge	250	3	45
paradoxa	Paradoxical Sedge	250	4	45
pauciflora	Few-flowered Sedge	249	6	43
pendula	Great Pendulous Sedge	253	7	50
pilulifera	Round-headed Sedge	254	2	51
pseudocyperus	Cyperus-like Sedge	253	8	50
præcox	Vernal Sedge	253	10	50
pulicaris	Flea Sedge	249	4	43
punctata	Salt Marsh Sedge			49
rariflora	Loose-flowered Alpine Sedge	253	2	50
remota	Distant-spiked Sedge	249	13	45
rigida	Rigid Sedge	251	7	47
riparia	Great Common Sedge	254	11	53
rupestris	Rock Sedge	249	5	43
saxatilis	Russet Sedge	252	1	48
stellulata	Little Prickly Sedge	249	9	44
strigosa	Loose Pendulous Sedge	253	5	50
sylvatica	Pendulous Wood Sedge	253	6	50
teretiuscula	Lesser Panicled Sedge	250	5	44
tomentosa	Larger Downy-fruited Sedge	254	5	52
trinervis	Three-nerved Sedge			47
ustulata	Scorched Alpine Sedge	253	4	50
vaginata	Short Brown-spiked Sedge	252	10	50
vahlii	Close-headed Alpine Sedge	251	3	47
vesicaria	Short-beaked Bladder Sedge	254	9	52
vulgaris	Common Sedge	251	6	47
vulpina	Great Sedge	250	6	45
Catabrosa aquatica	Water Whorl-grass	260	4	69
Ceterach officinarum	Common Ceterach	305		139
Cladium mariscus	Prickly Twig-rush	245	1	38
Cynodon dactylon	Dog's-tooth-grass	278	5	98
Cynosurus cristatus	Crested Dog's-tail-grass	268	5	81
echinatus	Rough Dog's-tail-grass	268	6	82
Cyperus fuscus	Brown Cyperus	244	2	37
longus	Sweet Galingale	244	1	37
Cystopteris alpina	Alpine Bladder-Fern	299	2	129
dentata	Toothed Bladder-Fern	298	1	129
var. dickieana	Dickie's Bladder-Fern	298	2	129
fragilis	Brittle Bladder-Fern	*Frontispiece*		297	1	128
montana	Mountain Bladder-Fern	299	1	130
Dactylis glomerata	Rough Cock's-foot-grass	268	4	81
Digitaria humifusa	Glabrous Finger-grass	278	7	100
sanguinalis	Hairy Finger-grass	278	6	99
Eleocharis acicularis	Least Spike-rush	245	8	39
multicaulis	Many-stalked Spike-rush	245	7	39
palustris	Creeping Spike-rush	245	6	39
Elymus arenarius	Upright Sea Lyme-grass	275	1	91
geniculatus	Pendulous Sea Lyme-grass	275	2	92
Equisetum arvense	Cornfield Horsetail	317	1	163
hyemale	Rough Horsetail	317	2	172
limosum	Water Horsetail	317	3	173
mackayi	Mackay's Rough Horsetail			178
palustre	Marsh Horsetail	317	4	173

		Plate	Fig.	Page
Equisetum sylvaticum	Wood Horsetail	318	1	174
telmateia	Great Horsetail	319	1	176
umbrosum	Shady Horsetail	318	2	176
variegatum	Variegated Rough Horsetail	319	2	177
Eriophorum alpinum	Alpine Cotton-grass	248	1	41
angustifolium	Narrow-leaved Cotton-grass	248	5	42
capitatum	Round-headed Cotton-grass	248	3	42
gracile	Slender Cotton-grass	248	6	42
latifolium	Broad-leaved Cotton-grass	248	4	42
vaginatum	Hair-tail Cotton-grass	248	2	42
Festuca bromoides	Barren Fescue-grass	269	2	82
elatior	Tall Fescue-grass	269	6	84
gigantea	Tall Bearded Fescue-grass	269	7	84
ovina	Sheep's Fescue-grass	269	3	83
pratensis	Meadow Fescue-grass	269	5	84
sylvatica	Reed Fescue-grass	269	4	83
uniglumis	Single-glumed Fescue-grass	269	1	82
Gastridium lendigerum	Awned Nit-grass	257	3	66
Gymnogramme leptophylla	Fine-leaved Gymnogram	284	1	114
Hierochloe borealis	Northern Holy-grass	263	4	73
Holcus lanatus	Meadow Soft-grass	263	2	72
mollis	Creeping Soft-grass	263	1	71
Hordeum maritimum	Seaside Barley	275	6	93
murinum	Wall Barley	275	5	92
pratense	Meadow Barley	275	4	92
sylvaticum	Wood Barley	275	3	92
Hymenophyllum tunbridgense	Tunbridge Filmy-Fern	312	1	153
unilaterale	Wilson's Filmy-Fern	312	2	153
Isoetes hystrix	Porcupine Quillwort			168
lacustris	European Quillwort	316	1	166
Isolepis fluitans	Floating Mud-rush	246	1	39
holoschœnus	Round Cluster-headed Mud-rush	246	4	40
savii	Savi's Mud-rush	246	3	39
setacea	Bristle-stalked Mud-rush	246	2	39
Juncus acutiflorus	Sharp-flowered Rush	234	3	5
acutus	Great Sharp Sea Rush	233	3	5
balticus	Baltic or Coast Rush	233	1	4
biglumis	Two-flowered Rush	234	6	8
bufonius	Toad Rush	234	5	7
capitatus	Dense-headed Rush	235	7	8
castaneus	Clustered Alpine Rush	234	4	7
compressus	Round-fruited Rush	235	5	7
conglomeratus	Common Rush	234	1	3
effusus	Soft Rush	235	1	2
filiformis	Thread or Slender Rush	233	2	4
glaucus	Hard Rush	235	2	4
lamprocarpus	Shining-fruited Rush	233	5	6
maritimus	Lesser Sharp Sea Rush	234	2	5
nigritellus	Black-headed Jointed Rush	233	4	6
obtusiflorus	Blunt-flowered Jointed Rush	235	3	6
pygmæus	Dwarf Rush			8
squarrosus	Heath Rush	233	7	7
tenuis	Slender Spreading Rush	234	6	7
trifidus	Three-leaved Rush	235	4	7
triglumis	Three-flowered Rush	234	7	8
uliginosus	Lesser Bog Rush	233	6	6

		Plate	Fig.	Page
Knappia agrostidea	Early Knappia	278	2	98
Kobresia caricina	Compound-headed Kobresia	249	1	43
Koeleria cristata	Crested Hair-grass	263	5	73
Lagurus ovatus	Ovate Hare's-tail-grass	257	1	65
Lastrea cristata	Crested Fern	290		123
dilatata	Broad Prickly-toothed or Crested Fern	293		124
filix-mas	Male Fern	289		120
fœnisecii	Triangular Prickly-toothed Fern	291		122
oreopteris	Heath Fern or Mountain-Fern	287		118
rigida	Rigid Fern	288		119
spinulosa	Narrow Prickly-toothed Fern	292		124
thelypteris	Marsh Fern	286		117
Leersia oryzoides	European Cut-grass			60
Lemna gibba	Gibbous Duckweed	240	4	23
minor	Lesser Duckweed	240	2	22
polyrrhiza	Great Duckweed	240	3	23
trisulca	Ivy-leaved Duckweed	240	1	23
Lepturus filiformis	Sea Hard-grass	278	1	97
Lolium linicola	Annual Rye-grass	277	5	96
multiflorum	Bearded Rye-grass	277	4	95
perenne	Perennial Rye-grass	277	3	95
temulentum	Darnel	277	6	96
Luzula arcuata	Curved Mountain Wood-rush	236	5	9
campestris	Field Wood-rush	236	4	9
forsteri	Narrow-leaved Hairy Wood-rush	236	3	9
pilosa	Broad-leaved Hairy Wood-rush	236	2	8
spicata	Spiked Wood-rush	236	6	9
sylvatica	Great Hairy Wood-rush	236	1	8
Lycopodium alpinum	Savin-leaved Club-moss	315	3	163
annotinum	Interrupted Club-moss	315	2	162
clavatum	Common Club-moss	315	1	159
complanatum	Flat-stemmed Club-moss			163
inundatum	Marsh Club-moss	315	4	164
selaginoides	Prickly Club-moss	315	5	165
selago	Fir Club-moss	315	6	165
Melica nutans	Mountain Melic-grass	262	5	71
uniflora	Wood Melic-grass	262	6	71
Milium effusum	Spreading Millet-grass	257	2	65
Molinia cœrulea	Purple Molinia	262	4	71
Naias flexilis	Flexible Naias	243	5	30
marina	Greater Naias	243	6	30
Nardus stricta	Mat-grass	255	2	60
Narthecium ossifragum	Lancashire Bog Asphodel	236	7	10
Ophioglossum lusitanicum	Lesser Adder's-tongue	314	3	159
vulgatum	Common Adder's-tongue	314	2	158
Osmunda regalis	Royal Fern	313		154
Panicum crus-galli	Loose Panic-grass	264	2	74
Phalaris arundinacea	Reed Canary-grass	256	2	62
canariensis	Canary-grass	256	1	62
Phleum alpinum	Alpine Cat's-tail-grass	256	5	64
arenarium	Sea Cat's-tail-grass	256	9	65
asperum	Rough Cat's-tail-grass	256	6	65
bœhmeri	Purple-stalked Cat's-tail-grass	256	7	65
michelii	Michelian Cat's-tail-grass	256	8	65
pratense	Common Cat's-tail-grass	256	4	64
Phragmites communis	Common Reed	274	4	90
Pilularia globulifera	Creeping Pillwort or Pepper-grass	316	2	168

		Plate	Fig.	Page
Poa alpina	Alpine Meadow-grass	267	2	78
annua	Annual Meadow-grass	267	5	79
aquatica	Reed Meadow-grass	265	1	74
borreri	Borrer's Sea Meadow-grass	265	5	76
bulbosa	Bulbous Meadow-grass	267	1	78
compressa	Flat-stemmed Meadow-grass	266	3	77
distans	Reflexed Meadow-grass	265	4	76
fluitans	Floating Meadow-grass	265	2	75
laxa	Wavy Meadow-grass	267	3	79
loliacea	Dwarf Meadow-grass	266	2	77
maritima	Creeping Sea Meadow-grass	265	3	76
nemoralis	Wood Meadow-grass	267	4	79
pratensis	Smooth-stalked Meadow-grass	266	4	77
procumbens	Procumbent Sea Meadow-grass	265	6	76
rigida	Hard Meadow-grass	266	1	77
trivialis	Roughish Meadow-grass	266	5	78
Polypodium alpestre	Alpine Polypody	283		113
calcareum	Limestone Polypody	282		112
dryopteris	Oak-Fern	281		111
phegopteris	Beech-Fern	280		110
vulgare	Common Polypody	279		109
Polypogon littoralis	Perennial Beard-grass	257	6	66
monspeliensis	Annual Beard-grass	257	5	66
Polystichum aculeatum	Common Prickly-Fern	295		126
angulare	Angular-lobed Prickly-Fern	296		127
lonchitis	Alpine Fern or Holly-Fern	294		126
Potamogeton acutifolius	Sharp-leaved Pond-weed	241	3	27
crispus	Curly Pond-weed	241	5	26
densus	Close-leaved Pond-weed			27
filiformis	Slender-leaved Pond-weed			28
gramineus	Grassy Pond-weed	241	2	27
griffithii	Griffith's Pond-weed			26
heterophyllus	Various-leaved Pond-weed	242	3	25
lanceolatus	Lanceolate Pond-weed	242	4	25
lonchites	Lance-leaved Pond-weed			25
longifolius	Long-leaved Pond-weed	242	1	26
lucens	Shining Pond-weed	242	2	26
natans	Broad-leaved Pond-weed	242	8	24
oblongus	Oblong-leaved Pond-weed	242	7	25
pectinatus	Fennel-leaved Pond-weed			28
perfoliatus	Perfoliate Pond-weed	241	6	26
plantagineus	Plantain-leaved Pond-weed	242	6	25
prælongus	Long-stalked Pond-weed	241	7	26
pusillus	Small Pond-weed	241	1	27
rufescens	Reddish or Long-leaved Floating Pond-weed	242	5	25
salicifolius	Willow-leaved Pond-weed			26
trichoides	Hair-leaved Pond-weed			27
zosteræfolius	Grass-wrack-like Pond-weed	241	4	27
Pteris aquilina	Common Brake	309		143
Rhynchospora alba	White Beak-rush	245	2	38
fusca	Brown Beak-rush	245	3	38
Ruppia maritima	Sea Ruppia or Tassel-grass	243	1	28
Sagittaria sagittifolia	Common Arrow-head	237	5	13
Scheuchzeria palustris	Marsh Scheuchzeria	237	8	14
Schœnus nigricans	Black Bog-rush	244	3	37
Scirpus cæspitosus	Scaly-stalked Club-rush	247	5	41
carinatus	Blunt-edged Club-rush	247	1	41
lacustris	Lake Club-rush or Bull-rush	246	5	40
maritimus	Salt Marsh Club-rush	247	2	41
parvulus	Least Club-rush			41

		Plate	Fig.	Page
Scirpus pauciflorus	Chocolate-headed Club-rush	247	4	41
pungens	Sharp Club-rush	246	8	40
sylvaticus	Wood Club-rush	247	3	41
tabernæmontani	Glaucous Club-rush	246	6	40
triqueter	Triangular Club-rush	246	7	40
Scolopendrium vulgare	Hart's-tongue Fern	307		140
Scsleria cærulea	Blue Moor-grass	264	1	73
Setaria glauca	Glaucous Bristle-grass			74
verticillata	Rough Bristle-grass	264	3	74
viridis	Green Bristle-grass	264	4	74
Sparganium natans	Floating Bur-reed	238	6	16
ramosum	Branched Bur-reed	238	4	16
simplex	Unbranched Bur-reed	238	5	16
Spartina stricta	Twin-spiked Cord-grass	278	3	98
alterniflora	Many-spiked Cord-grass	278	4	98
Stipa pennata	Common Feather-grass	257	4	66
Trichomanes radicans	Rooting Bristle-Fern	311		150
Triglochin maritimum	Sea Arrow-grass	237	7	14
palustre	Marsh Arrow-grass	237	6	14
Triodia decumbens	Decumbent Heath-grass	268	1	80
Triticum caninum	Fibrous-rooted Wheat-grass	276	4	94
cristatum	Crested Wheat-grass	276	1	93
junceum	Rushy Sea Wheat-grass	276	2	93
repens	Creeping Wheat or Couch-grass	276	3	94
Typha angustifolia	Lesser Reed-mace	238	2	15
latifolia	Great Reed-mace	238	1	15
minor	Least Reed-mace	238	3	16
Woodsia alpina	Round-leaved or Alpine Woodsia	285	2	116
ilvensis	Oblong Woodsia	285	1	116
Wolffia arrhiza	Wolff's Duckweed			23
Zannichellia palustris	Common Horned Pond-weed	243	2	29
Zostera marina	Broad-leaved grass-wrack	243	3	29
nana	Dwarf grass-wrack	243	4	30

THE FLOWERING PLANTS

OF

GREAT BRITAIN

Order XCI. JUNCACEÆ—RUSH TRIBE.

PERIANTH 6-parted, usually chaffy, but sometimes coloured, as in Asphodel (*Narthecium*); stamens 6, inserted at the bases of the segments, or sometimes 3, inserted opposite the outer segments; anthers opening inwards; ovary superior; style solitary; stigmas 3 or (in Asphodel) 1; capsule 3-valved, usually many-seeded. This is a tribe of plants growing on moist lands, having cylindrical or grassy leaves, and, except in Asphodel, brown flowers. The true rushes (*Juncus*) are social plants, often covering large moist districts; many of them known in the coldest parts of the world, and a few in the tropics. The stems of some are used for making mats and the wicks of candles. With few exceptions, the species are perennials.

The popular notion of the Rush tribe connects its members with the Grasses through the Sedges. A certain superficial resemblance may justify this, but the botanical tyro who uses the pocket-lens and pulls the inflorescence carefully to pieces will soon be undeceived on that point. The flower of the Wood Rush, though minute, has all its parts corresponding closely with those of the lilies, but in the Sedges and Grasses the perianth has completely disappeared, and the stamens and pistils are enclosed in chaffy scales, called glumes. There are three British genera.

1. RUSH (*Juncus*).—Perianth chaffy; filaments smooth; stigmas 3; capsule 3-celled, 3-valved; seeds numerous, minute, roughish; leaves mostly round, rarely flat; mostly perennials. Name from *jungo*, to join—the stems having been used as cordage.

2. WOOD RUSH (*Luzula*).—Perianth chaffy; filaments smooth; stigmas 3; capsule 1-celled, 3-seeded; all perennials. Name supposed to be from the Italian *luciola*, a glow-worm, because the heads of flowers sparkle when wet with dew-drops.

3. BOG ASPHODEL (*Narthecium*).—Perianth of 6 coloured sepals and petals; stamens woolly; stigma 1; capsule 3-celled; seeds numerous. Name from the Greek *narthekion*, a rod, apparently from the long straight raceme of flowers in some of the species.

1. Rush (*Juncus*).

* *Stems cylindrical, tapering to a point; leaves reduced to sheaths*

1. **Soft Rush** (*J. effúsus*).—Stems soft, not furrowed, but faintly marked with lines; cyme branched below the summit of the stem; capsule blunt, a little shorter than the sepals; rootstock perennial, and creeping. This is a common Rush of marshy lands, growing in clumps to the height of one or two feet, and having no leaves, or merely a few scales, which serve as a sheath to the stems. The stems are soft and pliant, of a pale green; and the brown cyme, which appears in July, is sometimes very spreading, at others nearly globose, and is usually about halfway down the leaf-like stem. The stems of both this and the next species are used for plaiting into mats and chair-bottoms, and their pith was once very extensively used as wicks for candles. Ere lights of a superior character had superseded the rush-lights, these were to be found in most households, and many cottagers used no candles save such as they could make from the rushes of the neighbouring wet meadow land; but in few counties in our time are these home-made candles now in use, nor are rushes now gathered largely for sale. Even yet, however, in Norfolk, there exists an annual fair called a Rush Fair. This, which was formerly held at the village of Sprowston, near Norwich, was termed the Magdalen Fair; but in consequence of disorderly conduct in the frequenters of the place, that particular fair was done away, though a fair for the sale of rushes is yet held outside the Magdalen gates. A correspondent of the *Gardener's Chronicle* estimated the quantity of rushes brought, a few years since, annually to this spot, at about eight hundred gross; each gross containing twelve bundles, each bundle twelve whips, and each whip about fifty rushes. The rushes are said by this writer to be gathered chiefly from the Happing and Flegg Hundreds, and to be collected mostly by women, who wade in the water of the bogs up to their waists to procure them. They are often assisted by their children in preparing them for sale. This is done by soaking, drying, and peeling them.

But, in earlier days, rushes were of far greater importance in the household economy of this kingdom, when sleeping apartments, dining-rooms, halls, theatres, and even the presence-chambers in palaces, as in that of Queen Elizabeth, were strewed with them. That floors were occasionally paved with coloured tiles, some old illuminations serve to show; and carpets, which were introduced in the thirteenth century, were used in the royal apartments of Edward III.; but until carpets became general, the floors were mostly of board, and strewn with rushes. In an account of Thomas à Becket, published in 1528, the writer says, "He was manfull in his household, for his hall was everie daye, in somer season, strewed with greene rushes, and in winter with clene hey, for to save the knyghtes' clothes that sate on the floor, for defaute of place to sit on." The floors in the "good old times" were not very frequently washed; and that the rushes often concealed much that was offensive to the eye, we know from the disgust expressed by Erasmus, as well as by some English writers, at bones and other refuse being daily thrown from the table, while in few homes were the rushes daily or even

1. BALTIC RUSH. *Juncus balticus.*
2. THREAD R. *J. filiformis.*
3. GREAT SHARP SEA R. *J. acutus.*
4. BLACK HEADED JOINTED R. *J. nigritellus.*
5. SHINING FRUITED J. R. *J. lamprocarpus.*
6. LESSER DOG J. R. *J. uliginosus.*
7. HEATH R. *J. squarrosus.*

weekly renewed. Old painters represent dogs as hunting for bones among the plants around the table; but probably in many houses, and in later days even generally, more attention to cleanliness was given, and sweet and fresh flowers were mingled with newly-strewn rushes. Bulleyne says, "Rushes grown upon dry ground be good to strew in halls, chambers, and galleries, to walk upon, defending apparel, as trains of gowns and kirtles, from the dust." Lemnius, a physician and divine of Zealand, remarks, on his visit to London, with great approval, the cleanliness of the English, and says, "Their chambers and parlours, strawed over with sweete herbs, refreshed me; their nosegays, finely intermingled with sundry sorts of fragrant flowers in their bed-chambers and private rooms, with their comfortable smell cheered me up, and delighted all my senses." The churchwardens' accounts of the church of St. Mary-at-Hill show that rushes were commonly used in churches; for several items occur similar to the following: "Paid for two berden of rushes for the strewing the newe pewes, *3d.*"

The great use of rushes for strewing led to certain festivals, called Rush Bearings, which, like the old wakes, became, in course of time, scenes of idleness and intoxication, and appear to have given annoyance to the sober portion of the community. These gatherings were gradually neglected as the use of rushes in households was discontinued. It is not improbable that the fibre of this and other common Rushes may prove of use to the paper-maker. The Chevalier de Claussen, in some experiments on plants likely to furnish paper-pulp, directed his attention to the papyrus—the "paper reed by the brook"—of which the ancients made their paper. He found that it contained a large proportion of fibre, easily bleached; but as this plant is so rare, an abundant supply would not be readily procured. "I directed, therefore," says the Chevalier, "my attention to plants growing in this country; and I found, to my great satisfaction, that the common Rushes (*Juncus effusus*), and others, contain forty per cent. of fibre, quite equal, if not superior, to papyrus fibre, and a perfect substitute for rags in the manufacture of paper; and that one ton of rushes contains more fibre than two tons of flax straw." The Chevalier had not found so large an amount of fibre in any native plant, except in the shavings of fir, which yielded the same proportion, but which required more expense in the preparation. Rye-grass was found also to furnish thirty-five per cent. of paper fibre, which was easily bleached; but this was not so strong as the Rush fibre. "Hemp and flax are," he says, "exactly suitable for the purpose of the paper-manufacturer, but their culture is expensive."

2. **Common Rush** (*J. conglomerátus*).—Stem soft, faintly marked with lines; cyme repeatedly branched, usually forming a round head, but in a variety more or less spreading; capsule terminating in a little point; root-stock creeping. This Rush is very similar to the last; and many botanists unite the two into one species. It has soft pliant stems, about two feet high; and the brown head of flowers, which expands in July, grows at some distance from the summit. It differs from *J. effusus* in the denser, more globose head of flowers, in the perianth being tinged with brown, and in the anthers being longer and narrower. It is, like the last, a very common plant, and was doubtless as much used for strewing in olden times. Its pith

was also used for candles, as it still is for making little baskets and children's toys. Rushes are, in country places, often twisted together to tie hurdles and other rustic implements; and the rushes of some countries are commonly made into ropes and cables, while the earliest cordage was probably made of them. Professor Burnett says that sailors call cables junks, as *juncus* itself is a derivation of *jungo*, to bind or join together. Most persons, whose early days were spent in the country, have woven them into baskets; and many a country boy could say with Clare—

> "And on this bank how happy have I felt,
> When here I sat and murmur'd nameless songs,
> And, with the shepherd-boy and neat-herd, knelt
> Upon yon rush-beds, plaiting whips and thongs!"

The French call the Rush *Jonc*, and their cream-cheese is called *jonchée*, because served up on its little frail of green rushes. The Germans term the plant *Binse*. A large species of Rush is cultivated in Japan entirely for making floor-mats; and mats and chair-bottoms were formerly made in this country of our Common Rushes; but the Lake Club Rush (*Scirpus lacustris*) is now used for that purpose, and is much better adapted for it.

3. **Hard Rush** (*J. glaúcus*).—Stem very rigid, and strongly marked with lines; cyme loose, much branched, erect; capsule oblong, pointed, rather shorter than the sepals; rootstock creeping, black. This Rush is about two feet high, its stems tough, rigid, and glaucous, with purplish sheaths at the base. It bears, in July, a panicle of greenish-brown flowers, with a broad green line down the middle of each segment of the perianth; and six stamens. It is a common plant by ditches, on moory grounds and moist waysides, and is sometimes very troublesome on wet lands used for pasture. It is gathered in Holland while green, and afterwards used by gardeners in tying trees and shrubs.

A plant, described as *J. diffúsus*, is thought by some botanists to be a hybrid between *glaucus* and *effusus*. It is a stiff hard Rush, differing in its much smaller capsule; which, instead of being oblong with a spinous point, is inversely egg-shaped and blunt; its stem, too, is softer and more faintly marked with lines. It is found growing with the last two species, but is apparently rare.

4. **Baltic Rush, or Coast Rush** (*J. bálticus*).—Stem rigid, naked, pungent, straight, acute; cyme erect, branched, few-flowered; bracts shorter than the panicle; capsule oblong, blunt, spine-tipped; rootstock creeping. The stems of this Rush are about a foot high, smooth, with brown scales at the base. It bears, in July and August, its dense panicle near the top, consisting of dark brown flowers, with a pale line down each segment. It was discovered by Mr. Drummond on the sands of Barry, near Dundee, and has since been found on sandy sea-shores, and on the banks of rivers not far from the sea, in several parts of Scotland. Its root creeps extensively.

5. **Thread Rush, or Slender Rush** (*J. filifórmis*). — Stem naked, slender, nodding; cyme few-flowered; capsule nearly globular, spine-tipped; rootstock forming a loose tuft. This species is remarkable for its thread-like stems, which, in August, bear their panicles of greenish-brown flowers on one side, far below the middle. This Rush is very slender and pliant,

1. COMMON RUSH.
   Juncus conglomeratus
2. LESSER SHARP SEA R.
   J. maritimus
3. SHARP FLOWERED JOINTED R.
   J. acutiflorus
4. CLUSTERED ALPINE R.
   J. castaneus
5. TOAD R.
   J. bufonius
6. TWO FLOWERED R.
   J. biglumis
7. THREE FLOWERED R.
   J. triglumis

Pl. 234.

and of a pale green hue. It is rare, growing on the stony margins of lakes in the English Lake District, and in Kincardineshire. It is about ten or twelve inches high.

6. **Lesser Sharp Sea Rush** (*J. maritimus*).—Stem wiry, naked, the barren leaf-like ones very sharp pointed; cyme loose, near the summit; outer bracts spinous; stamens 6; capsule oblong, spine-tipped, as long as the perianth; rootstock tufted and fibrous. This is not a generally distributed Rush; but it grows among the sand-grasses by the sides of some salt rivers, and in salt marshes in various parts of the kingdom:

> "On ocean's marge,
> Whose mellow reeds are touch'd with sounds forlorn
> By the dim echoes of old Triton's horn."

It is rare in Scotland. In places where it is plentiful, it aids, with the other plants, to consolidate marshy and muddy soils. Its stems are slender, about two feet high, and its very pale brown flowers appear in August, in a long loose panicle. Its stems have leafy clammy sheaths at their base.

7. **Great Sharp Sea Rush** (*J. acutus*). — Stem rigid, naked, sharp-pointed; cyme dense, near the summit; outer bracts spinous; capsule broadly egg-shaped, suddenly terminating in a point; segments of perianth about half as long as the capsule; rootstocks tufted. This, which is the largest of our native Rushes, is truly a magnificent plant, and cannot fail to attract the observation of those who wander among the sand-hills, or the no less dreary salt-marshes where it grows. Its large clumps of tall, stiff, straight stems, looking like masses of rigid deep green leaves, are from three to six feet in height; and in July the crowded panicles of brown flowers are conspicuous at the tops of the stems, though not nearly so much so as the large, glossy, bright brown capsules, which, in September and October, succeed them. These are so handsome, that we are fain to gather them to mingle with the few seaside flowers yet left to the autumn; but safer far would it be for the hand to grasp the seaside holly, with all its prickles, than to encounter this sharp Rush, which has penetrated many an unguarded finger with no slight wound. This plant grows on the shores of Norfolk, and some other counties; but it is rare, occurring chiefly on the south and west coasts of England and Wales. On the sandy shores about Sandwich, in Kent, and between that place and Pegwell Bay, as well as on some of the neighbouring salt-marshes, clumps of this plant may be seen often near the roadside, with masses of tall green fennel waving near them. It is also found in South and South-East Ireland and the Channel Islands. This Rush is also planted on some of our shores, to preserve them from the encroachments of the sea; for its fibrous roots run far down into the light soft soil, forming a matted mass, which aids in its consolidation. The stems are plaited into ropes, baskets and mats.

* * *Stems leafy; leaves rounded, or somewhat flattened, jointed internally.*

8. **Sharp-flowered Jointed Rush** (*J. acutiflorus*).—Stems and leaves slightly flattened; cyme repeatedly compound; segments of the perianth unequal, very acute, nearly as long as the egg-shaped taper-pointed capsule; stamens 6; rootstock creeping. This is a slender plant, one or two feet

high, bearing its pyramidal panicle of chestnut-brown flowers near the top of its erect stem in July and August. The clusters are 3 to 12-flowered, and the capsules are of a pale brown hue. It is one of our most common Rushes, growing in bogs and ditches, and such places as Clare refers to, when describing the scenes of childhood:

"Swamps of wild Rush-beds, and sloughs' quashy traces
Grounds of rough fellows, with thistle and weed,
Flats and low valleys of kingcups and daisies,
Sweetest of subjects are ye for my reed.

"And long, my dear valleys, long, long may ye flourish,
Though Rush-beds and thistles make most of your pride!
May showers never fail your green daisies to nourish,
Nor suns dry the fountain that rills by its side!
Your skies may be gloomy, and misty your mornings,
Your flat swampy valleys unwholesome may be,
Still, refuse of Nature, without her adornings,
Ye are dear as this heart in my bosom to me."

This is the *J. articulatus* of Linnæus.

9. **Black-headed Jointed Rush** (*J. nigritéllus*).—Stem and leaves somewhat rounded; cyme erect, slightly compound, 3 inner segments of the perianth rather longer and broader, all shorter than the capsule; capsule linear-oblong, 3-sided, and beaked. This species was reported by D. Don as growing on the mountains of Clova. Sir J. D. Hooker, however, regards the specimens from Don in Borrer's herbarium as examples of *J. lamprocarpus*.

10. **Shining-fruited Jointed Rush** (*J. lamprocárpus*).—Stem and leaves somewhat flattened; cyme repeatedly compound; capsule egg-shaped, acute, longer than the perianth; stamens 6. This is a very common Rush in boggy and marshy places, and is one or two feet high. Its flowers appear in July and August, and are succeeded by dark brown shining capsules. Its erect terminal cyme might have fitted it for Chaucer's description:

"The stalke was as rishe right,
And thereon stood the knops upright."

11. **Lesser Bog Rush, or Little Bulbous Rush** (*J. uliginósus*).—Stem erect, sometimes swollen into a bulb at the base, leafy; leaves bristly, and rather knotty; heads lateral and terminal, about 3-flowered; capsule blunt, longer than the perianth. This Rush is common in wet places, and very variable, assuming the bulbous form only when growing on somewhat drier spots. It is from three to eight inches high, and bears, from June to August, a few little distant clusters of greenish-brown flowers, succeeded by the blunt light-brown capsules. When growing in very damp places, its stems become prostrate, and rooting at each joint; and it is then the *J. subverticillatus* or *J. supinus* of some botanists.

12. **Blunt-flowered Jointed Rush** (*J. obtusiflórus*).—Stem and leaves rounded; cyme forked and spreading; segments of perianth very blunt, as long as the 3-sided pale brown capsule; rootstock creeping. This is not an infrequent plant on wet pastures and marshy places—

"With many a flag and rushy bunch bespread."

The stems, which are about two feet high, are not tufted; they bear, in July, the brownish flowers sometimes tinged with purple.

1 SOFT RUSH
Juncus effusus

2 HARD R.
J. glaucus

3 BLUNT FLOWERED JOINTED R.
J. obtusiflorus

4 THREE LEAVED R.
J. trifidus.

5 ROUND FRUITED R.
J. compressus

6 SLENDER SPREADING R.
J. tenuis

7 CAPITATE R.
J. capitatus.

Pl. 235.

* * * *Stems leafy; not cylindrical nor jointed.*

13. **Clustered Alpine Rush, or Black-spiked Rush** (*J. castáneus*).—Stem simple, with 2 or 3 half-round hollow leaves at the lower part; heads of flowers terminal, usually solitary or in pairs, shorter than the numerous leafy bracts; capsule shining, nearly twice as long as the sepals; rootstock creeping. This is a very rare plant of the Highlands of Scotland and the north of England, growing in bogs at a great elevation. It is erect, and is from eight to ten inches high, flowering in July and August.

14. **Three-leaved Rush** (*J. trifidus*).—Stem usually having one long leaf; sheaths awned, those at the base of the stem leafless; bracts 2, at the top of the stem, very slender and bristle-like; heads terminal, of about 3 flowers; rootstock and sheaths forming a dense matted mass. This rare species, inhabiting damp, rocky, mountainous places, has crowded, erect, thread-like stems, from four to ten inches high. Its pale brown flowers appear in July and August.

15. **Round-fruited Rush** (*J. compréssus*).—Stem erect, flattened above, and rounded below; leaves linear, channelled; cyme terminal, in one form shorter, in another longer, than the bracts; capsule roundish, spine-tipped; rootstock creeping. This Rush bears slender unbranched stems, from six to twelve inches high, and acute channelled leaves. Its flowers appear in July on moist pastures, where it is common. A sub-species, with few-flowered panicles longer than the bracts, is found on salt grassy places, and is the Mud Rush (*J. gerardi*).

16. **Slender Spreading Rush** (*J. ténuis*).—Stem slender, wiry, forked above, panicled; leaves linear, slightly channelled; capsule egg-shaped, shorter than the very acute leaflets of the perianth; rootstock tufted. This is a slender Rush, about a foot high, flowering from June to August, and very rare. It occurs in moist sandy places in Herefordshire.

17. **Toad Rush** (*J. bufónius*).—Stem branched, leafy; leaves angular, bristle-like, channelled; cyme forked, longer than the bracts; perianth segments taper-pointed, membranous, longer than the capsule; annual. This is a very small Rush, and is common in wet grounds. It is from four to eight inches high, its forked panicle bearing solitary flowers, mostly on one side of the stem, the flowers being pale green, with a white border. Its leaves are so very slender, that one might mistake it for one of the grasses; and it is sometimes called Toad-grass. Its stems are numerous, crowded together, and of a light green colour. It flowers in July and August.

* * * * *Leaves all from the roots.*

18. **Heath Rush** (*J. squarrósus*).—Leaves rigid and channelled; heads clustered; capsule inversely egg-shaped and spine-tipped; stems tufted, rigid The stems of this Rush are about a foot high and compressed. It has many stout rigid leaves, most of which turn one way. The rather large flowers appear in July, and are glossy brown, edged with yellowish-white. It is found on heathy grounds, such as Crabbe describes:

> "Here pits of crag, with spongy plashy base,
> To some enrich the melancholy place;

For there are blossoms rare, and curious Rush,
The gale's rich balm, and sundew's crimson blush,
Whose velvet leaf, with radiant beauty drest,
Forms a gay pillow for the plover's breast."

This species is sometimes called Moss-rush, or Goose-corn; and it often fringes in abundance damp moory spots.

19. **Dense-headed Rush, or Capitate Rush** (*J. capitátus*).—Stem erect, bristle-like, unbranched, leafy at the base; head sessile, solitary; bracts bristle-like; outer segments of the perianth awned; capsule egg-shaped, tipped with a short spine. This little annual Rush grows on sandy grounds in Cornwall and Jersey. It is from two to four inches high, with leaves two or three inches long. Its terminal head of flowers appears from May to July.

20. **Two-flowered Rush** (*J. biglúmis*).—Stem simple; leaves awl-shaped; head solitary, 2-flowered, 1-sided, with leafy bracts longer than itself; capsule larger than the segments of the perianth; rootstock sending out stolons. This is a rare plant, found in the bogs of Highland mountains. It flowers in August.

21. **Three-flowered Rush** (*J. triglúmis*).—Stem erect, unbranched; leaves awl-shaped, channelled; head solitary, terminal, 3-flowered, with membrane-like bracts; capsule acute, very dark brown; rootstock tufted, black. This Rush is from three to six inches in height, flowering in July. It grows on the elevated mountains at the north of England, and in Wales, and is especially frequent in the Highlands of Scotland.

22. **Dwarf Rush** (*J. pygmæus*).—Stems tufted, slender, simple or forked; root-leaves bristle-like, channelled, stem-leaves with the base eared; flowers 1 to 5, scarcely stalked, with egg-shaped bracts; perianth-segments narrow lance-shaped, 3-nerved, membranous, with glossy margins quarter of an inch long; capsule shorter, oblong-lance-shaped, 3-angled, pale. This minute annual Rush is only a couple of inches high. It flowers in May and June, and may be sought in damp places about the Lizard, Cornwall, such as the Downs above Kynance Cove.

2. Wood Rush (*Lúzula*).

1. **Great Hairy Wood Rush** (*L. sylvática*).—Panicle cymose, doubly compound; flowers in bundles of 3 or 4; segments of the perianth awned, as long as the spine-tipped capsule; rootstock short, tufted, throwing out runners. The long flat leaves of this and the other species which formed the *Gramen Luzulæ* of the older botanists render them, in general appearance, more similar to grasses than to Rushes. The stem of this plant is a foot or a foot and a half high, and is terminated, in May and June, by a loose cluster of brownish flowers, varied with yellow anthers. It has broad taper-pointed leaves, shining, marked distinctly with lines, and fringed with long white scattered hairs, the root-leaves forming a tuft. The capsules are of a bright chestnut colour. The plant is common in woods and shady places, especially among bushes in hilly districts. It is the *L. maxima* of some botanists.

2. **Broad-leaved Hairy Wood Rush** (*L. pilósa*).—Panicle cymose,

1. GREAT HAIRY WOOD RUSH.
Luzula sylvatica.
2. BROAD LEAVED H. W. R.
L. pilosa.
3. NARROW L. H. W. R.
L. forsteri.
4. FIELD WOOD R.
L. campestris.
5. CURVED MOUNTAIN W. R.
L. arcuata.
6. SPIKED M. W. R.
L. spicata.
7. LANCASHIRE BOG ASPHODEL.
Narthecium ossifragum.
8. COMMON FLOWERING RUSH.
Butomus umbellatus.

Pl. 236.

little branched, spreading; capsule blunt, scarcely as long as the perianth; leaves lanceolate, hairy; rootstock short, tufted, with slender runners. This is a smaller species than the last, and readily distinguished from it by its dark brown flowers, growing singly on the partial flower-stalks, instead of being in little bundles. The stem is about a foot high, and the leaves are ribbed, and fringed with long fine white hairs. It flowers in April and May, and may be found in shady places, pretty well throughout the British Isles. Also known as *L. vernalis.*

3. **Narrow-leaved Hairy Wood Rush** (*L. forstéri*).—Panicle cymose, erect; partial stalks single flowered; capsule pointed, nearly as long as the perianth; leaves linear, hairy. This plant, though resembling the last in habit, is much slenderer, and has narrower leaves. It is about a foot high, and bears its brown flowers in April and May. It is a somewhat local plant, inhabiting woods and thickets, but is common in some parts of the kingdom where the soil is chalky or gravelly. Its distribution here is bounded by lines drawn from South Wales to Cornwall and Oxford, Essex to Oxford and Kent. It also occurs in the Channel Islands. A plant which is by some botanists regarded as a species, and by others as a hybrid, has been by Dr. Bromfield termed *L. borreri.* It is larger, and has a loose panicle, the upper stalks of which turn back after flowering; the filaments are also shorter. It occurs in the Isle of Wight, Sussex, and Herefordshire, as well as in Wicklow. Its short acute capsule does not ripen the seeds.

4. **Field Wood Rush** (*L. campestris*).—Panicle of a few dense clusters; segments of the perianth pointed, longer than the capsule; capsule inversely egg-shaped, blunt, with a small point; rootstock creeping, tufted. This is a common plant in dry pastures, bearing its dark reddish-brown flowers in oblong spikes during April and May. It has a straight unbranched stem, from three to ten inches high, and dark green leaves, very hairy at the margin. A taller variety of this plant, in which the spikes are almost all sessile, and collected into a nearly round head, is the var. *erecta.*

5. **Curved Mountain Wood Rush** (*L. arcuáta*).—Panicle somewhat umbellate, of few heads, with long, drooping curved branches; bracts membranous, fringed; capsule roundish and pointed, shorter than the bristle-pointed segments of the perianth; leaves channelled, slightly hairy; rootstock creeping, and forming loose tufts, with slender runners. This is the smallest and one of the rarest of our native species, its slender stem varying from two to four inches in height. The leaves are leathery, short, narrow, and curved; those from the roots numerous. The dark chestnut flowers appear in July. It is found on the highest summits of the Cairngorm and Sutherland mountains.

6. **Spiked Wood Rush** (*L. spicáta*).—Spike oblong, dense, compound and nodding, the clusters shorter than their bracts; segments of the perianth narrow, and bristle-pointed, as long as the capsule; capsule acute; leaves small, leathery, slightly channelled, and hairy; rootstock densely tufted. This is a mountain species, growing in North Wales, Westmoreland and ...tland, at altitudes between 1,000 and 4,300 feet. It bears, in July, its ...dding spike of dark brown flowers on a slender stem six or eight inches high. Its short narrow leaves are hairy at the margins of their sheaths.

3. Bog-Asphodel (*Narthécium*).

Lancashire Bog-Asphodel (*N. ossífragum*).—Leaves sword-shaped, rigid, ribbed and pointed; stamens much shorter than the perianth; filaments white and woolly; rootstock creeping, wiry, and perennial. This elegant little flower is a favourite with the botanist who fears not to tread the moist grassy bog, where it overtops the sundew and bog-pimpernel. It is not infrequent on wet places and moors, especially in mountainous districts; ascending to over 3,000 feet in the Highlands. The leaves grow mostly from the root in tufts, and are grass-like, about half the height of the stem, of a pale green colour, and marked with prominent ribs. The slender stem is about six or seven inches high, with a leaf here and there, and is often bending and rooting at the base. The star-like flowers are bright yellow, greenish at the back, the anthers deep orange, and the filaments covered with thick wool. They grow in a tapering spike, one bract being at the base, and another just above the middle of each partial flower-stalk. An old prejudice was entertained in various Continental countries, and still exists among the Swedish peasantry, that this plant is injurious to sheep, rendering their bones so brittle as to be easily broken; hence its name, *ossífragum*, bone-breaking, which has its synonym in many lands. The French call it *Brise-os;* the Germans, *Beinbrechgras;* and the Dutch, *Beenbreekend.* Linnæus, in his "Flora Lapponica," refuted the notion of its injurious properties; and it is indeed usually left untouched by sheep, though readily eaten by cows and horses. It has much similarity to the genus *Anthericum*, in which Linnæus placed it, though it is separated by modern botanists. Gerarde, who called it the Lancashire Asphodell, says of it: "It growes in manie rotten moorish grounds in this kingdome, and is used in Lancashire by women to die their haire of a yellowish colour, and therefore is by them termed Maiden-hair. It groweth neere unto the towne of Lancaster, as also neere unto Maudsley and Martom, not far from thence, where it was found by a learned and worshipful gentleman,—a diligent searcher of simples, and a fervent lover of plants,—Mr. Thomas Hesket, who brought the plants thereof into use for the encrease of my garden."

Order XCII. BUTOMACEÆ—FLOWERING RUSH TRIBE.

Perianth segments 6, all coloured; stamens 9; ovaries superior, 6, or more, distinct, or united into a mass; follicles beaked, many-seeded, splitting open when ripe. This is a small tribe of aquatic plants, with handsome umbellate flowers and sword-shaped leaves, sometimes included in the order Alismaceæ.

Flowering Rush (*Bútomus*).—Stamens 9; carpels 6. Name from the Greek *bous*, an ox, and *temno*, to cut, because cattle cut their mouths with the leaves.

Flowering Rush (*Bútomus*).

Flowering Rush (*B. umbellátus*). — Leaves erect, narrow, acute, triangular, sheathing at the base, all from the roots; flower-stalk round,

smooth; rootstock stout, creeping, perennial. This is one of the loveliest plants which grace the quiet waters of England south of Yorkshire and Durham, flowering when the water-lilies have withered. It is rare in Ireland, and in Scotland it occurs only as a naturalized plant. The 3-sided leaves are so sharp that they often wound the hand extended to gather the showy cluster of rose-coloured flowers. These, surrounded by their membranous involucre, stand far above the surface of the water, on a stalk two or three feet high. Anthers and ovaries are alike red. The leaves are one or two feet long, generally twisted at the upper end, and much shorter than the flower-stalk. They are very acrid, and have been used medicinally, both seeds and roots having been formerly considered as antidotes to the bite of venomous reptiles. The white tuberous rootstocks are said to be roasted and eaten in Northern Asia. The numerous flowers are each on a partial stalk, which is often three or four inches long; and they vary from a delicate pink to white, and are sometimes much tinged with purple, while the stalks are often reddish. Gerarde calls the plant the Water Gladiole, or Grassie Rush, and says, "It is, of all others, the fairest and most beautiful to behold, and serveth very well for the decking and trimming up of houses, because of the beautie and braverie thereof." The French call the flower *Butome*, and the Germans, *Blumenbinse*.

Order XCIII. ALISMACEÆ—WATER PLANTAIN TRIBE.

Sepals 3, green; petals 3, coloured; stamens varying in number; ovaries superior, numerous; carpels numerous, 1 or 2-seeded, not splitting when ripe. This is a small tribe of perennial aquatics, often floating, and with long stalked leaves rising from the root. The rootstocks of some species are used as food in various countries.

1. WATER PLANTAIN (*Alisma*).—Flowers containing both stamens and pistils; stamens 6; carpels 1-seeded. Name from *alis*, water, in Celtic.

2. STAR-FRUIT (*Actinocarpus*).—Flowers containing pistils and stamens; stamens 6; carpels 2-seeded, and arranged in a star-like form. Name from the Greek *aktin*, a ray, and *karpos*, a fruit.

3. ARROW-HEAD (*Sagittaria*).—Stamens and pistils in separate flowers; stamens numerous; carpels 1-seeded. Name from the Latin *sagitta*, an arrow, from the shape of the leaves.

1. WATER PLANTAIN (*Alisma*).

1. Greater Water Plantain (*A. plantago*).—Leaves egg-shaped and heart-shaped, or lanceolate, all from the rootstock; capsules bluntly triangular. The large bright green leaves of this plant, placed on thick stalks, and strongly nerved, much resemble those of the Common Plantain, and are more conspicuous above the water than the flowers, though those which are quite under the surface are of a different form, being long and narrow. The flowers grow on a bluntly 3-sided stalk, which is two or three feet high, and much branched at the upper part. They expand during July and August, are small, of a delicate rose colour, and so frail that they are

scattered in gathering. Though this Plantain grows quite in the water, yet it is often near enough to the margin to be reached by the hand; and it is found in lakes, ditches and pools throughout the three kingdoms, and in the Channel Islands; it is plentiful in the south and rare in the north. The swollen base of the stem contains a nutritious farinaceous matter; and the plant has for some centuries past been regarded as a most valuable remedy in cases of hydrophobia. Several cases have been recorded by Lewshin, Moser, and other writers, in which two drachms and a half daily of the root were administered internally, and a cataplasm made of the crushed leaves. Our best botanists, however, doubt if the plant is of any real efficacy in this malady. The roots are commonly eaten by the Kalmuck Tartars. A writer in the *Encyclopédie des Sciences* says, "It has the singular property of curing those who have eaten the sea-hare;" and adds, that Hoffman praises it as a vulnerary, and that it is by the peasants substituted for hellebore in the disorders of cattle. The singular thing would be that anybody should eat the sea-hare; but if they did, it is very doubtful whether it would disagree with them.

2. **Floating Water Plantain** (*A. nátans*).—Root-leaves linear, taper-pointed, and sessile; floating leaves stalked, oblong, blunt; stem leafy, floating, and rooting; capsule marked with lines. This is a very rare species, found in ponds and lakes, chiefly along the west side of England, from Cumberland to Hereford and Wales. In Scotland it is recorded from Ayr and Wigton, and in Ireland from the west. The stems are thread-like, and from three to ten feet long; and the flower-stalks issue from the joints of the stem, and are erect and single-flowered. The blossoms appear in July and August, and are large and white, with a yellow spot near the centre; the root-leaves grow in small tufts, and are often little more than leaf-stalks. Some authors separate this species from the others, and constitute it a genus under the name of *Elisma natans*.

3. **Lesser Water Plantain** (*A. ranunculoides*).—Leaves all from the root, linear lanceolate; flower-stalk with simple branches, in one or two whorls; capsules angular, acute, numerous, in a globular head; root fibrous. In one form the plant is erect, in another (var. *repens*) trailing, the umbels rooting. This is not a common plant, though found in many ditches and bogs throughout the kingdom. It is much smaller than the Great Water Plantain, which it otherwise resembles, except that its flowers are proportionately larger, and grow in one or two whorls. They expand in August, and are of a pale purplish colour. The flower-stalks are from three to ten inches long.

2. Star-fruit (*Actinocarpus*).

Common Star-fruit (*A. damasónium*).—Leaves oblong, all from the root; flowers similar to those of *Alisma;* styles 6; root fibrous, and perennial. This, which is not a frequent plant, occurs in ponds and ditches in the midland and south-eastern counties of England. The leaves float on the water on long stalks; and the flowers, which grow in whorls on a stalk about six inches high, are white, with a yellow spot in the centre. The fruit is very remarkable for the arrangement of its six or eight large carpels in a

1 COMMON STAR FRUIT.
Actinocarpus damasonium

2 GREATER WATER PLANTAIN.
Alisma plantago

3 FLOATING W. P.
A. natans

4 LESSER W. P.
A. ranunculoides

5 COMMON ARROW HEAD.
Sagittaria sagittifolia

6 MARSH A. H.
Triglochin palustre

7 SEA SIDE A. H.
T. maritimum

8 MARSH SCHEUCHZERIA.
Scheuchzeria palustris

starry form. This was one of the numerous plants which had an old repute for curing the imagined poison of the sea-hare. It is also known as *Damasonium stellatum.*

3. Arrow-head (*Sagittária*).

Common Arrow-head (*S. sagittifólia*).—Leaves on long stalks, all from the root, arrow-shaped, the lobes lanceolate and straight; flowers of two kinds on the same plant, the upper ones containing a large number of stamens, the lower ones with carpels only. The staminate flowers are larger than the pistillate ones, and are supported on longer footstalks. The large bright green arrow-shaped leaves of this plant render it of easy recognition, even by those who are not botanists. The borders of many a stream or river present a mass of verdure by the quantities of its foliage. In July and August very pretty white 3-petalled flowers, with purple centres, sometimes a blush of pink upon them, grow in whorls, on a stalk about six or eight inches above the water. The plant sends out runners, each one ending in a tuber, and these tubers contain a large portion of a nutritious substance. In China, Japan, and Siberia, the plant grows in great abundance in the pools; and the Chinese cultivate it to a considerable extent, as the tubers constitute a large proportion of their vegetable food. The tubers are dried; and the powder into which they are ground is described as similar to the West India arrowroot, but having a somewhat acrid flavour. Probably this acridity might be removed by the same preparation as that which renders the far more acrid root of the Arum as tasteless as the flour of wheat. The Chinese use several plants as food which are not commonly considered fitted for it; and their Government gives considerable attention to the subject. Dr. Badham, in his work on the "Edible Funguses of Britain," mentions a Chinese work, consisting of six volumes, with plates, entitled the "Anti-famine Herbal," containing the descriptions and representations of four hundred and fourteen different plants, whose leaves, rinds, stalks, and roots, are fitted to furnish food for the people, when drought, ravages of beasts, or the overflow of the great rivers, has caused a failure of rice and other grain. The Chinese Government annually prints and distributes this book gratuitously in the districts which are most exposed to these calamities; and the Doctor adds, that the example of the Chinese ought to be suggestive to us that a more general knowledge of the properties and capabilities of esculent plants would be an important branch of education. It has been suggested that the Arrow-head should, in this country, be cultivated as an experiment; but it is thought that this would be attended with too great an expense. The tubers attain a larger size in China than in this country.

Mr. Baxter, referring to this beautiful aquatic, remarks, "Representations of this often occur in Oriental paintings, associated with the consecrated cyamus, or sacred bean. The late Mr. Richard Payne Knight, so distinguished for profound learning, suggested to Sir J. E. Smith, that as the cyamus is an acknowledged emblem of fertility and reproduction, the Arrow-head indicates the contrary, or a destroying power. They are the Egg and the Anchor, or the Arrow-head, so general in architectural ornaments."

Order XCIV. JUNCAGINACEÆ—ARROW-GRASS TRIBE.

Flowers perfect; perianth green and small, or none; stamens 6; ovaries 3—6, superior, united, or distinct; carpels 3—6, 1—2-seeded. This is a small order of marsh plants, possessing no remarkable properties.

1. ARROW-GRASS (*Triglóchin*).—Perianth of 3 outer and 3 inner erect leaves; stamens 6; flowers arranged in a spike, without bracts. Name from the Greek *treis*, three, and *glochin*, a point, from the three points of the capsule.

2. SCHEUCHZERIA.—Perianth of 6 reflexed leaves; flowers in racemes, with bracts; stamens 6; stigmas sessile; capsules 2-valved, 1—2-seeded. Named in honour of the Scheuchzers, Swiss botanists.

1. ARROW-GRASS (*Triglochin*).

1. **Marsh Arrow-grass** (*T. palústre*).—Leaves linear, channelled, and succulent, all from the root, smooth, and nearly erect; capsule 3-celled, narrow; root fibrous. This is a perennial plant, abundant by the sides of rivers and on marshy lands, and might, during June and July, at the first glance be mistaken for the seaside plantain, though its flowers are much fewer, and more scattered over the upper part of the stalk. They are green, sometimes tinged with red. The succulent leaves are membranous, and sheathing at the base. Cattle are very fond of this plant.

2. **Sea Arrow-grass** (*T. maritimum*).—Leaves semi-cylindrical, all from the root; capsule egg-shaped, 6-celled. This species is much like the last, but is a taller and stouter plant, and well distinguished by its rounded capsule, and paler green hue. It has a saline flavour, and its greenish-yellow flowers expand from May to September. Both species are quite innocuous, but they afford little nutriment. Goldfinches may be seen sometimes pecking very busily at their young buds. The genus was formerly called *Juncago*, because the plants, like the rushes, grow in bogs and wet situations. The French call our plant *Troscart;* the Germans *Salzgras.*

2. SCHEUCHZERIA (*Scheuchzéria*).

Marsh Scheuchzeria (*S. palústris*).—Stem erect, unbranched; leaves alternate, blunt, semi-cylindrical; perennial. This plant is, by its slender semi-cylindrical leaves, very nearly allied to the rushes. It bears, in July, a raceme of yellowish-green flowers, with large bracts, on a wavy stalk, about six inches high. It is very rare, growing among the bog-mosses in some tracts of Yorkshire, Cheshire, Nottingham, near Shrewsbury, and at Methven, near Perth.

Order XCV. TYPHACEÆ—REED-MACE TRIBE.

Stamens and pistils in separate flowers on the same plant; flowers dense spikes or heads, not enclosed in a sheath, the heads of male flow above; perianth composed of 3 scales, or a tuft of hairs; stamens 3— distinct, or united by their filaments; anthers long, and wedge-shaped; ova single, superior, 1-celled; style short; stigma linear, lateral; fruit 1-cell

1-seeded, not opening. This is a small order of herbaceous plants, with creeping rootstocks, jointless stems, and sword-shaped leaves, common in marshes and ditches.

1. REED-MACE (*Typha*).—Flowers in long spikes; perianth none, except hairs; stamens surrounded with hairs; anthers 3 together on one filament; ovary stalked, with hairs at its base. Name from the Greek *tiphos*, a marsh, from the place of growth.

2. BUR-REED (*Sparganium*).—Flowers in dense globular heads, each with a single perianth of 3 scales; stamens 3 in the barren flower; stigma of fertile flower awl-shaped. Name from the Greek *sparganon*, a little band, from the long leaves.

1. CAT'S-TAIL, OR REED-MACE (*Typha*).

1. **Great Reed-mace** (*T. latifólia*).—Leaves linear, somewhat convex beneath; catkin continuous, its common stalk hairy; perennial. During the months of July and August, few plants are more conspicuous than the Great Reed-mace among the reeds and sedges which fringe our lakes and pools. Its round erect stem is often six feet high, and its leaves an inch broad, three or four feet long, and of a bluish colour. The long spikes of flowers on their reedy stem render its name of Reed-mace very appropriate; the fertile spike is thick and brown, often a foot long, bearing at its summit the long slender yellow terminal barren one, which has one or two large bracts. Village people call the plant Bulrush, and believe that it was woven into the cradle for the infant Moses; and Rubens and other Italian painters represent our Saviour as holding this plant in His hand, when, in cruel mockery, a Reed was given Him as a sceptre. The flower abounds in yellow pollen, which is so inflammable, that if a candle is applied to it, it instantly produces a flash of light. It was on this account formerly used, instead of the spores of the club-mosses, in exhibitions of fireworks; but it is not easily collected in any quantity. Professor Burnett says, that it is a good stimulant in the cure of diseased skin; and Gerarde records that the "downe of the Reed-mace hath been proved to heale kibed or humbled heels, as they are termed, either before or after the skin is broken." As the brown portion of the catkin ripens, the downy tufts, which are very numerous, loosen from their hold, and, becoming gradually detached, fly in multitudes on the summer breeze. They are sometimes used for filling pillows and mattresses; and Kalm mentions that the Swedes formerly placed this down in their beds instead of feathers, but that it became matted and entangled in the course of time. The long leaves are used in thatching; mats and baskets are made of them; and coopers sometimes put them between the staves of casks to prevent leakage. The Swedes lay these leaves beneath the horse's saddle to relieve the pressure. Haller mentions that the roots are eaten in salad. The plant contributes much to the luxuriant growth of our aquatic herbage, inasmuch as, with its companions by the water-side, by its successive growth and decomposition, it renders the soil fitted for more important plants. The Reed-mace is in Kent often called Flax-tail; the French call it *Massette*.

2. **Lesser Reed-mace** (*T. angustifólia*).—Leaves linear, convex beneath, channelled above; barren and fertile spikes usually separated from each

other, both cylindrical; the common stalk scaly; perennial. This species, which is much smaller than the last, is not generally distributed. It is, however, common on the river and pool sides in some places, as in the neighbourhood of London. The stem is about four or five feet high, the catkins not nearly so thick as in the common species, and the leaves not so broad. A plant called *T. minor*, with narrow bristled leaves, and mostly distant spikes, is described by Dillenius as having grown on Hounslow Heath, but nothing has been known of it in recent years.

2. BUR-REED (*Spargánium*).

1. **Branched Bur-reed** (*S. ramósum*).—Leaves triangular at the base, their sides concave; common flower-stalks branched; stigma linear; perennial. This plant is well named Bur-reed, from the clustered fruits which, during autumn, look like large burs. It is one of our commonest aquatics, and is two or three feet high, with a green sturdy branched stem, having on its upper part long narrow leaves, which wave in the winds with a rustling sound. In July and August the flowers appear growing in dense globular heads; the barren ones small and olive-brown until the yellow anthers spread and make them appear as large as the lower ones, which contain the fertile flowers. After the flowers, the globular heads of seeds enlarge till they are of the size of a small apple. They are at first green, gradually becoming brown, when the ripened seeds fall. These are about as large, as firm and as heavy as a grain of barley.

2. **Unbranched Upright Bur-reed** (*S. símplex*).—Leaves triangular at the base, their sides flat; common flower-stalk unbranched; stigma linear; perennial. This, which is a common water-plant, is readily distinguished from the last species by its unbranched flower-stalk. It is about two feet high, and altogether smaller than the Branched Bur-reed. It grows in ditches, and by the sides of lakes and pools, and bears in July and August globular heads of pale yellow flowers.

3. **Floating Bur-reed** (*S. nátans*).—Leaves floating, flat; common flower-stalk unbranched; stigma egg-shaped, very short, perennial. This species, though more abundant in the pools, lakes, and rivers at the north of this kingdom, is widely distributed. It flowers in July, rising but a few inches above the surface of the water, and it has very long transparent leaves. A more slender form is recognised as a sub-species under the name of *S. minimum*.

Order XCVI. AROIDEÆ—ARUM TRIBE.

Stamens and pistils separate, but on the same plant; flowers arranged on a spadix or central column, and enclosed in a sheath; perianth none; stamens numerous, sessile on the spadix; ovaries numerous, sessile below the stamens; stigmas sessile; fruit a fleshy berry. This is a remarkable tribe of perennial plants, possessing acrid and even poisonous properties, which are, however, removed by some means of preparing the roots, when they may be used as food. They are abundant in tropical countries, and the

1. GREAT REED MACE.
   Typha latifolia.
2. LESSER R. M.
   T. angustifolia.
3. DWARF R. M.
   T. minor.
4. BRANCHED BUR REED.
   Sparganium ramosum.
5. UNBRANCHED UPRIGHT B. R.
   S. simplex.
6. FLOATING B. R.
   S. natans.

flowers and foliage of all the tribe have much general resemblance to our common British species, the Cuckoo-pint.

CUCKOO-PINT (*Arum*).—Flowers on a club-shaped spadix, which is naked above, and enclosed in a convolute sheath. Name from the Greek *aron*, its meaning doubtful.

CUCKOO-PINT (*Arum*).

1. **Cuckoo-pint** (*A. maculátum*).—Stem none; leaves halberd-shaped, somewhat arrow-shaped, entire; common stalk of the flowers club-shaped, blunt; rootstock tuberous. Every rambler in green lane, by the thick hedgerow, or the sunny bank which borders the meadow, delights, in early spring, to see the bright green glossy leaves of the Cuckoo-pint, spotted often with dark purple stains, and commonly four or five inches long. Those of us whose youthful days were spent in companionship with birds and flowers and waving trees, could sympathize with the feelings of Clare:

> "How sweet it used to be, when April first
> Unclosed the Arum leaves, and into view
> Its ear-like spindling flowers their cases burst,
> Betinged with yellowish, white, or purplish hue!
> Ah, how delighted, humming on the time
> Some nameless song or tale, I sought the flowers!
> Some rushy dyke to jump, or bank to climb
> Ere I obtain'd them; while from hasty showers
> Oft under trees we nestled in a ring,
> Culling our Lords-and-ladies. O ye hours!
> I never see the broad-leaved Arum spring,
> Stainéd with spot of jet—I never see
> Those dear delights which April still does bring,
> But Memory's tongue repeats it all to me."

Scarcely an English hedgerow but has, in March, its store of the glossy handsome leaves; while in April the tall spathe unrolls and exhibits the central spadix, about three inches long, sometimes of a yellowish hue, at others greenish-purple, and often of a deep rich violet colour, though this tint is easily rubbed off. A ring of glands (aborted anthers) surrounds the middle of the spadix, and below this is a circle of sessile anthers; while, lower still, it is surrounded by the sessile ovaries, which, as the year advances, develop into a cluster of brilliant scarlet berries. Long after the leaves have withered, the stalk, about a foot high, thickly covered at the top with these fruits in a conspicuous mass, may be seen glistening among the sober-tinted wintry leaves beneath the woodland boughs. The berries are highly poisonous, and every part of the plant is acrid.

Particular interest attaches to the arrangement of the organs on the lower part of the spadix. At one time it appeared to be quite correct to say it was a plan for ensuring the fertilization of the pistils by the pollen falling on them from above. But then observation showed that the pistils were mature, and had set their seeds before the anthers commenced to discharge their pollen. It was found that the unpleasant odour of the Arum attracts large numbers of small flies, whose usual food is decaying toadstools. They enter the spathe and easily pass the barrier of hairs from the aborted anthers, which, however, do not allow them to pass upwards again. If they have previously visited an Arum spathe, they are likely to bring pollen from

it attached to their hairy wings, and this gets shaken off upon the stigmas. Until fertilization has taken place the flies are kept prisoners, but after that is effected the anthers let fall a shower of pollen upon them, the pistils secrete honey for their reward, and the shrivelling-up of the barrier of hairs sets them free to carry pollen to a slightly later Arum flower. The colour of the spadix and the unpleasant odour has direct relation to the visits of these flies.

The Greek name Aron is thought by Sir William Hooker to have been derived from *ar* or *aur*, which in Hebrew and various old languages signifies fire, and to have been given from its burning taste; while Skinner thinks that its common country name of Wake Robin was bestowed because its acrimony would awaken the sleeping. The plant has a singular power of evolving heat from its spadix, at the expansion of the sheath. Professor Lindley records that Sennebier observed that the bulb of a thermometer, applied to the surface of the spadix of this species, indicated a temperature seven degrees higher than that of the external air; and M. Hubert found this heat in a more wonderful degree in the species termed *A. cordifolium*, in the Isle of France. A thermometer, placed in the centre of five spadixes of this plant, stood at one hundred and eleven degrees; and in the centre of twelve spadixes, at one hundred and twenty-one degrees, though the temperature of the surrounding air was only sixty-six degrees.

Many a country child knows something of the acridity of the Arum; and the author once saw the lips and tongue of a little friend much inflamed by having bitten the spadix. The application of milk soothed the pain in some measure, but it was not wholly removed for more than an hour. Yet the root, which is a tuber rather larger than a walnut, contains a farinaceous substance well fitted for making bread, or a dish resembling in flavour the Indian arrowroot. The author having, in a little book published some years since, named this flour of the root, was, during the famine in Ireland consequent on the failure of the potato crop, applied to by a gentleman residing in Galway for some information on the subject. The applicant, who commanded a fort in the neighbourhood of which the Arum grew in abundance, stated that he had roasted and boiled these tubers, but that they still retained too great an acridity for use. The author, who could at that time discover no record of the mode of preparation, could only give the result of her own experiments on the plant, and directed her correspondent, after drying the root, to grate it into water, and after a time to remove the liquid. The sediment was again to be washed, and finally dried. The benevolent inquirer tried this plan, and afterwards assured his correspondent that he had thus been enabled to prepare several packets of flour, perfectly free from flavour, and fit for use. The celebrated Portland sago has been long known to be obtained from the Arum root. This substance, which is more like arrowroot than sago, has from time immemorial been made in Portland Island; and, in 1797, a gold medal was given by the Society of Arts to Mrs. Jane Gibbs, for procuring a sample of starch for economic purposes from the root. A writer in the *Pharmaceutical Journal*, who in the year 1853 resided near Portland, gives a full account of the process used in the island; and from his statement are gathered the following particulars. The starch, or arrowroot,

1. CUCKOO PINT
Arum maculatum
2. SWEET SEDGE
Acorus calamus
4. OPPOSITE LEAVED PONDWEED
Potamogeton densus
3. FENNEL LEAVED P
P pectinatus

Pl. 239.

is made by crushing the Arum-root in a mortar, stirring the mass in water, and straining off the liquor. The mass must be again washed and dried. The corms are said to yield about four pounds of fecula to the peck. The manufacture of this article was some years since much greater in Portland Isle than it now is, though it was never of any great commercial importance, and it is now almost extinct, and never seen out of the island, except in cases in which botanists make experiments upon plants. The writer adds that it was formerly customary to crop the lands in the island every other year, leaving them fallow during the intervening seasons, at which time the inhabitants received permission from the owners of the lands to dig up the Arum-roots. But the theory of the rotation of crops is now acted on there, as elsewhere, and the once fallow land is now covered with the green blade, or in some spots has been built over. The Arum has consequently become much less abundant, and the writer found it difficult at that time to procure a sample of the Portland sago; he also ascertained that an old woman in the island was then the sole manufacturer. The plant, besides its almost universal name of Lords-and-Ladies, is called in the island by its old name of Cows-and-Calves, as well as Arrow-root and Starch-root. The writer remarks, that it is singular that it should be called Arrow-root, probably from its arrow-shaped leaves; and asks: "May not the *Maranta arundinacea* (Indian arrow-root) have derived its name from the previously known and appreciated Arrow-root of the Island of Portland?" The general opinion is, however, that the Maranta was so called because its pounded root is used by the Indians to extract the poison from wounds inflicted by the arrow.

The tubers of various species of Arum form a very important article of food in many tropical countries. Sir Joseph Hooker, when in the Himalayas, mentions having pitched his tent at ten thousand feet above the sea, amid an undergrowth of holly, and surrounded by magnificent rhododendrons, roses, willows, white flowering cherry, birch, and maple trees. "Some great tuberous-rooted Arums," he says, "were very abundant, and the ground was covered with small pits, in which were large wooden pestles; these are used in the preparation of food from the Arums, to which the miserable inhabitants of the valley have recourse in spring. The roots, when bruised, are thrown into the holes with water. In seven or eight days an acetous fermentation commences, and this is a sign that the poisonous principle is dissipated." The pulpy mass is afterwards boiled and eaten; its nutriment consisting in the starch, which exists in small quantities, and which the ignorant inhabitants have not the skill to separate by grating and washing. The Doctor adds that this food produces illness, and a loss of the skin and hair, especially when the root is insufficiently fermented; but in all probability a better mode of preparation would render the root perfectly wholesome. The *Arum esculentum* is much eaten by the South Sea islanders, and appears to form really good food.

Besides the common modern names of our Cuckoo-pint, it was known by several others to old herbalists: they called it Ramp and Friar's Cowl; and the French still call it *Bonnet de Grand Prêtre*, as well as *Pied de Veau*, *Pain de Lièvre*, *Le Gouet*, and in the southern provinces *Chou poivre*. It is said to form the basis of their celebrated cosmetic, termed cypress powder, which is

one of the few cosmetics which are perfectly harmless. The Germans call the plant *Aronswurz*. Gerarde tells how the root was used "by way of cataplasm, blisterwise. The green leaves were commonly placed on the skin in eruptive disorders, and even the berries were crushed and drunk with wine, though this must have been a dangerous medicine. An old writer remarks: "Tragus reporteth that a drachm weight or more, if need be, of the Spotted Wake Robin, either fresh and greene, or dried and taken, is a present and sure remedy for poison and the plague. The juice of the herb swallowed to the quantity of a spoonful, hath the same effect; but if there be a little vinegar added thereto, as well as to the root aforesaid, it somewhat allayeth the sharpe biting taste upon the tongue." Modern medicines are not very pleasant to the palate, but truly may the invalid rejoice that the caustic Arum-juice is not among them. The root when fresh is undoubtedly very stimulant; and Ettmüller says, that cut in small pieces, and taken in brandy, it is a good medicine for loss of appetite, but it is a highly dangerous one.

But a still more frequent use was made of the Arum-root, when, in the days of Queen Elizabeth, it furnished the starch for the ruffs worn by the gentlemen and gentlewomen of those times. Gerarde, who, like the people of Portland, called it Starch-wort, says, "The most pure and white starch is made from it;" but he adds, that it is "most hurtfull to the hands of the laundresse that hath the handling of it; for it chappeth, blistereth, and maketh the handes rough and rugged, and withall smarting." The immense lawn ruffs of those days needed some especially strong starch, nor could our English clear-starchers give them sufficient stiffness, till a Dutch woman came to London to teach the art of starching, and she probably used this root for her purpose. Queen Elizabeth, though she herself chose to wear these most uncomfortable ruffs, yet so disapproved of the excesses of her subjects in this particular, that she ordered men to stand at the city-gates to cut down all ruffs more than a yard deep; and it was probably well for the hands of the laundresses, that, in the time of James I., ruffs grew into disrepute among the fashionable, because Mrs. Turner, an accomplice in the death of Sir Thomas Overbury, was hanged in this article of dress. John Ray mentions that Arum-roots were formerly used as soap.

The berries of the Cuckoo-pint are eaten by birds, especially pheasants; and Gilbert White, of Selborne, remarked, that in severe winters thrushes dig up and eat the roots.

2. **Roman Arum** (*A. italicum*).—Leaves halberd-shaped, but more triangular than in *A. maculatum;* spathe three times the length of spadix, tip drooping; spadix always yellow; berries longer. This species, which is in all respects much larger and stouter than ordinary examples of the common species, was long confounded with it in this country. It is restricted in range to the most southern portions of our country, and even within these limits is very local. It may be looked for in woods and hedgerows from Cornwall to Sussex, and in the Channel Islands. There are several points by which it may be distinguished from *A. maculatum*, apart from its superior size, which alone may cause vigorous specimens of the common species to be mistaken for it. The leaves of *A. italicum* are pro-

duced during winter; those of *A. maculatum* in spring. There is the relative lengths of spathe and spadix: in *maculatum* the spadix being half the length of the spathe, and in *italicum* only one-third. The colour of the spadix, which varies from yellow to livid purple in *maculatum*, is *always* yellow in *italicum*; the pistils are longer in *italicum*, as also are the aborted anthers, whose hair-like processes act as a barrier to the lower part of the spathe.

Order XCVII. ORONTIACEÆ—SWEET SEDGE TRIBE.

Flowers perfect, arranged on a central column or spadix, at first enclosed in a sheath; perianth of 4 to 8 scales; stamens the same in number as the scales; ovary superior; fruit a berry. This order consists of herbaceous plants, with broad, often sword-shaped, leaves.

SWEET SEDGE (*Acorus*).—Spathe leaf-like, not convolute; spadix cylindrical, covered with sessile flowers; capsule triangular, abrupt, 3-celled; seeds several. Name from the Greek *a*, without, and *korion*, the pupil of the eye, because formerly used in diseases of that organ.

SWEET SEDGE (*Acorus*).

Sweet Flag (*A. calamus*).—Spathe leafy, rising far above the spadix; leaves erect; rootstock creeping, perennial. This plant grows on the banks of rivers in the midland and south-eastern counties of England, but neither very generally nor plentifully, except in Norfolk and Suffolk, where it is abundant. Though occurring in one or two places in Ireland and Scotland, it is not indigenous to either of these countries, but naturalized. It is very much like a sedge or large grass, but is readily distinguished by its spadix, which is three or four inches long, and of a pale greenish-yellow colour, overhung by a long flat leaf, while stem, roots, leaves, and all portions of the plant, emit a most pleasant aromatic odour. Our fathers called it Cegge, or Wylde Gladone, and this, as well as the common sedges, probably shared in the general name of Stare, or Starre. The French call it *L'acore odorant*, and the Italians, *L'acoro*; it is the *Kalmus*, or *Calamus*, of the Germans. In some country places it is called Myrtle Sedge, probably because, like the myrtle, it is a fragrant plant. The whole herb is both aromatic and bitter; and Linnæus remarked that it was the only aromatic plant of northern climates.

In former days the Sweet Sedge was used in the garlands hung in churches or dwellings. When floors were strewed with rushes, this sedge was probably used by the rich; and some writers believe it to have been very generally employed for this purpose, and to have been, in former days, much more plentiful in this kingdom than it now is. From time immemorial it has been used for strewing the floors of the cathedral of Norwich, and has been thrown on some of the adjoining streets on the day of choosing the mayor of that city, as also on other festival days, while common rushes and sedges sometimes mingle with it on these occasions. When trodden on, its fragrance becomes stronger, and the old cathedral seems filled with incense. The people of Norfolk still prize it as a cure for agues, and grind the root to powder to be thus used; and the root has been thus employed

medicinally since the days of Hippocrates. It has, doubtless, tonic properties, and in our own times has proved a successful remedy in fever, even in cases in which Peruvian bark has failed. In Egypt it is called *Cassabel*, and is much valued, and the roots have long been imported into this country from the Levant, though our own are as good as those of the foreign plants. The rootstock is very large, and full of a farinaceous substance, rendered fragrant by an essential oil. In Turkey it is made into a sweetmeat, and sold in the shops as a stomachic, and is peculiarly prized during the prevalence of any infectious disease. It formerly grew on the brinks of rivers about London, but Professor Burnett, who remarks that it is consumed in great quantities by perfumers and the makers of hair-powder, says that it has been almost wholly destroyed in that neighbourhood by their continual maraudings.

Order XCVIII. LEMNACEÆ—DUCKWEED TRIBE.

Stamens and pistils in different flowers on the same plant; flowers 1 to 3 in a spathe, but without a spadix; perianth none; stamens 1—2, distinct; ovary 1-celled; style short; stigma simple. The order consists of floating herbaceous scale-like annual plants, without distinction of stem or leaf.

1. DUCKWEED (*Lémna*).—Spathe membranaceous and cup-shaped; flowers from clefts just below the margin of the frond; anthers 2-celled; pollen rough. Name from the Greek *lepis*, a scale.

2. WOLFFIA (*Wolffia*).—Fronds very minute, rootless, flattened above, budding from the cleft base; flowers produced on upper surface of frond, without spathes; anthers without filaments, 1-celled; pollen smooth. Named in honour of *J. F. Wolff*, an authority on *Lemna*.

1. DUCKWEED (*Lémna*).

1. **Lesser Duckweed** (*L. minor*).—Fronds inversely egg-shaped, and somewhat convex beneath; root solitary. This is a plant with which all who have in summer-time gazed upon our standing waters are sure to be familiar. Lying there in large floating masses, mingling itself among the crow-silks and other *Confervæ*, it in some places entirely covers the surface of the pool with a mass of verdure; all these common water-plants increasing so rapidly in warm weather as sometimes to occasion trouble to the owners of the waters. The little fleshy green frond has no distinct stem or leaf; it is nearly flat at the top, but slightly rounded beneath, very thick, and succulent, of a bright green colour, sometimes a little tinged with purplish-red. These fronds are collected into twos and threes, each one sending down a single root. The Duckweeds increase more by buds than by their flowers, but this species flowers very commonly in July; its flower is too inconspicuous to be seen, unless carefully looked for. Professor Lindley describes this flowering of the Duckweed in the most simple and graphic manner. "If," he says, "you will fix your eye attentively upon a mass of it on a still sunshiny day, in June or July, you will probably discover exceedingly minute straw-coloured specks, here and there, on the edges of the plants; they have a sparkling appearance, and, notwithstanding their minuteness, readily catch

1. IVY LEAVED DUCKWEED
Lemna trisulca
2. LESSER D.
L. minor
3. GREATER D.
L. polyrhiza
4. GIBBOUS D.
L. gibba

Pl. 240.

the eye. These are the anthers, and they being found, you have only to carry home the plants, and place them under the microscope, when all the secrets of their flowering stand revealed. Where the anthers have caught the eye will be seen a narrow slit, out of which they peep; if you widen this slit with your dissecting instrument, you will be able to extract the blossom entire, and you will have before your eyes the simplest of all known flowering plants. The flower consists of a transparent membranous bag, shaped like a water-caraffe, and split on one side; within it are two stamens and one ovary, with a style and simple stigma."

What Dr. Lindley here describes as the flower is really the spathe, each stamen representing a separate flower. Enlarged representations of the inflorescence of this and other species are given on our plate, beside the enlarged figure of the plant.

Country people still frequently call the Duckweed Water-lens. Gerarde terms it Water-lentils, and adds, that the Dutch call it *Weerlinden*. He names it also as the Duckweed, and gives a curious engraving, in which the ducks appear to be luxuriating upon it.

2. **Ivy-leaved Duckweed** (*L. trisúlca*).—Fronds thin, between elliptical and lanceolate, serrated towards one end, and tailed at the other; roots solitary. This plant is not unfrequent on clear waters, chiefly in England and the Channel Islands; in Ireland and Scotland it is rare. Its fronds are green, and clear at the margin, half an inch or more long, bearing each a root, which is tipped with a little cap or sheath. This sheath is found to be an especial organ, formed before the root bursts forth. The form of this Duckweed is very different from that of any other species; and Linnæus remarked that its flattened fronds producing new plants, and crossing each other, resembled in their mode of growth the *Opuntia*, or Indian fig. It is a common species on ponds and lakes.

3. **Gibbous Duckweed** (*L. gíbba*).—Fronds inversely egg-shaped, hemispherical beneath. This plant is larger than the Lesser Duckweed, green above, and distinguished by its bulging lower surface, which is white and clear. It floats in ditches, pools, and lakes, flowering from June to September.

4. **Greater Duckweed** (*L. polyrhíza*).—Fronds broadly egg-shaped, somewhat convex beneath; roots numerous. This is the largest of our native Duckweeds, and has thick firm fronds, about half an inch long, and almost as broad. The under part is tinged with purple, and the upper side is marked with seven nerves. The plant is rare on our stagnant waters; in Scotland it occurs locally, but is a doubtful native. It is, like all our Duckweeds, an annual, sinking in winter to the bottom of the pool.

2. Wolffia (*Wolffia*).

Wolff's Duckweed (*W. arrhiza*).—Frond oblong, loosely cellular beneath; root absent. This species has the distinction of being the smallest flowering plant at present known to science. Seeing that the longest measurement of the frond is only one-twentieth of an inch, and its breadth half that dimension, a rival for this honour is not very likely to be discovered. Until 1886, when it was discovered by Mr. H. Trimen, it had been quite overlooked

in this country, and its minuteness is no doubt answerable for the fact that it has hitherto been recorded only from a few of the home counties. The young plants are produced singly at the base of the old fronds, but soon detached. It is also known as *Lemna michelii*.

Order XCIX. NAIADACEÆ—POND-WEED TRIBE.

Flowers perfect, or imperfect; perianth either tubular, composed of scales, or wanting; stamens free, 1, 2, or 4; ovaries 1-celled; fruit either a hard nut, or a drupe enclosing a hard nut, 1-seeded. This order consists of plants inhabiting ponds, streams, the sea, or salt-marshes; their leaves sometimes almost leathery, but more often thin and transparent, and the flowers small and green.

1. POND-WEED (*Potamogéton*).—Flowers in a spike; stamens and pistils in the same flower; perianth of 4 sepals; stamens 2 or 4; carpels 4, sessile. Name from the Greek *pótamos*, a river, and *geíton*, a neighbour.

2. RUPPIA (*Rúppia*).—Flowers about 2 on a stalk; stamens and pistils in the same flower; perianth none; stamens 2; carpels 4, at first sessile, afterwards raised, each on a long stalk. Name from Henry Bernard Ruppius, a botanist of the last century.

3. HORNED POND-WEED (*Zannichéllia*).—Flowers axillary; stamens and pistils in separate flowers; stamens 1; carpels 4—6. Name from J. J. Zannichelli, a Venetian botanist.

4. GRASS-WRACK (*Zostéra*).—Flowers composed of stamens or pistils separately arranged in two alternate rows, in a long leaf-like sheath; perianth none. Name from the Greek *zoster*, a girdle, from its long riband-like leaves.

5. NAIAS (*Naias*).—Flowers solitary or crowded, containing a single anther or a solitary carpel; leaves linear, either opposite, in bundles or whorled; stipules attached to the base of the leaf. Name from the Greek *Naïas*, a water-nymph.

1. POND-WEED (*Potamogéton*).

* *Upper leaves floating.*

1. **Broad-leaved Pond-weed** (*P. nátans*).—Upper leaves between oblong and egg-shaped, stalked, leathery, ribbed; lower leaves linear, membranous, often wanting, or reduced to a mere stalk; fruit keeled at the back. This, which is a very common plant in ponds, ditches, and slowly-moving waters, varies in size according to the depth of the water, scarcely having any submerged leaves in those which are shallow. The floating leaves are smooth, of a dull olive-green, and two or three inches long, on long stalks; and the lower ones, when present, look like grass-leaves, and are sometimes a foot in length. The stem is round, and, in July and August, the cylindrical spikes of small green flowers rise above the surface of the pool. The roots are a favourite food of swans, and they are also eaten in Siberia by the peasantry. An old name for this plant was Water-spike; the French call it *Le Potamot*. It is a common "river guest" in the waters of most European countries.

2. **Oblong-leaved Pond-weed** (*P. oblóngus*).—Leaves all stalked, upper ones leathery, floating, oblong-elliptical, lower ones linear-lanceolate, fruit small, with the back blunt and rounded; spike slender, cylindrical, densely flowered, upon a long rounded flower-stalk. This species, which is thus described by Mr. Babington, is by him considered as distinct from the last, of which some botanists consider it but a variety. This author remarks that it is far from uncommon in wet ditches, small streams, and bogs in Britain, but rare in Ireland. Its fruit is about half as large as that of *P. natans*, and differs in form. It bears in July short spikes of greenish flowers. It is of a more membranous character than *P. natans*, and the submerged leaves are well developed. It is also known as *P. polygonifolius*. A plant considered by Sir Joseph Hooker to be a form of this species, has been described by Boswell under the name of *P. kirkii*. It has been found at Galway in Ireland, and is distinguished by its very long floating leaves of a somewhat leathery consistence, and by the submerged leaves being long and linear like those of *P. lanceolatus*.

3. **Plantain-leaved Pond-weed** (*P. plantagíneus*).—Leaves all long stalked, membranous, and pellucid, upper ones elliptical, opposite, floating, lower ones submersed, and oblong; stipules short, broad. This Pond-weed has a creeping stem, which throws out long running shoots. It is a beautiful plant, with clear bright netted green leaves, and reminds one of some of the sea-weeds which rise so gracefully in the salt-water pools. It bears long greenish dense spikes of flowers in June and July, and is found in stagnant ditches and bogs in several counties. Also known as *P. coloratus*.

4. **Reddish Pond-weed, or Long-leaved Floating Pond-weed** (*P. ruféscens*).—Upper leaves oblong, or inversely egg-shaped, tapering into a short stalk, somewhat leathery; lower leaves linear-lanceolate, and tapering at both ends, sessile. In this plant the floating leaves are somewhat tough, and the lower thin and membranaceous. The plant is of a dull olive-green, more or less tinted with a dingy red colour. It bears its spikes of greenish flowers in July, and is found in still waters and ditches in various parts of the kingdom. Also known as *P. alpinus*.

5. **Lanceolate Pond-weed** (*P. lanceolátus*).—Floating leaves stalked, somewhat leathery, many-nerved, sometimes wanting; submersed leaves sessile, lanceolate, tapering at the base, membranaceous. This plant bears its small, short, dense spikes of greenish flowers in July and August. It is a rare species, inhabiting rivers; it has been recorded from Anglesey, Cambridge, and County Down. It has very slender stems.

6. **Various-leaved Pond-weed** (*P. heterophýllus*). — Upper leaves elliptical, stalked, slightly leathery, but not thick, often wanting; submersed leaves lanceolate, sessile, and membranaceous. In this plant the flower-stalks are enlarged at the upper part, and the spikes are dense. It flowers in July and August. It is a common species in pools, canals, ditches, and rivers generally, but rare in Ireland.

7. **Lance-leaved Pond-weed** (*P. lonchites*).—Stem stout, longer and less-branched than in *P. heterophýllus*, floating leaves usually wanting, if present oblong lance-shaped, long-stalked, opposite; submerged leaves strap-shaped, long and straight, alternate, translucent, with 7 to 9 ribs; flowers in

a short spike, the stalk slightly thickened upwards. This is a rare species found in the river Boyne, Ireland. It flowers from June to September.

** * Leaves all submersed and pellucid.*

8. **Curly Pond-weed** (*P. crispus*).—Stem flattened, much branched; leaves narrow, oblong, branched, sessile, serrate, usually wavy. This is one of the commonest Pond-weeds of our ditches and rivers, bearing in June and July its short loose spikes of yellowish-green flowers. Its leaves are often very much frilled at the edge, and of a brighter green than many of the species. It is evidently a very favourite plant with ducks, and probably with many other water-fowl, both wild and domestic; and as its creeping stems penetrate the soft soil, it propagates itself so quickly that it would, if left unmolested, soon fill a pond or slow river.

9. **Perfoliate Pond-weed** (*P. perfoliatus*).—Leaves heart-shaped, embracing the stem, uniformly membranaceous. This, too, is one of our commonest species, and its long slightly-branched stems occur in ponds and lakes. Its leaves are clear, and, when young, of a dull olive-green, becoming browner as they grow older, and appearing, when dried, as a thin brown membrane. The Rev. C. A. Johns remarks, that in their dry state they are so sensitive of moisture, that if laid on the palm of the hand they will curl up. The plant bears in July and August short oblong spikes of greenish flowers.

10. **Willow-leaved Pond-weed** (*P. salicifolius*).—Leaves all translucent, the submerged lance-shaped, half clasping; stems slender, rounded, slightly branched; flower-spike short, its stalk not enlarged upwards. It flowers in July, and has been found in rivers in Herefordshire.

11. **Griffith's Pond-weed** (*P. griffithii*).—Stem rounded, branched; lower leaves strap-shaped, half clasping the stem, with hollow tip; upper leaves lance-shaped, tapering into a long leaf-stalk; stipules blunt, long and slender; spike dense, on a slender stalk which is shorter than the upper leaves. It flowers in summer, and has been found only at Llyn-an-Afon, in Carnarvonshire.

12. **Long-stalked Pond-weed** (*P. prælongus*).—Leaves oblong, blunt, sessile, nerved from the lower part, and half-clasping; flower-stalks very long; stipules large. This rare species is one of the largest of our Pond-weeds, and is found in some ditches and rivers chiefly in the north of this kingdom, forming in deep water large thick masses just below the surface. It has very long stems, and clear dark green leaves, but the stipules are white, tinged with red, and are very long. The plant is well distinguished by the thick stalks of its flower-spikes, which are from half a foot to a foot in length. It bears a cylindrical many-flowered spike in June and July. It occurs in rivers between Caithness, Essex and Shropshire, also rarely in Ireland.

13. **Long-leaved Pond-weed** (*P. longifolius*).—Leaves very long and lanceolate, narrowing below; stipules winged; common flower-stalks very long. This plant, which was found in Lough Corrib, Galway, has long slender stems, and pellucid entire leaves, with very short stalks, and green prominently-winged stipules. Its spike of flowers appears in July and August.

14. **Shining Pond-weed** (*P. lucens*).—Leaves between elliptical and

1. SMALL PONDWEED
Potamogeton pusillus.

2. GRASSY P.
P. gramineum.

3. SHARP-LEAVED P.
P. acutifolius

4. GRASS WRACK LIKE P.
P. zosterifolius

5. CURLY P.
P. crispus

6. PERFOLIATE P.
P. perfoliatus

7. LONG STALKED P.
P. praelongus

lanceolate, narrowing at the top, and tipped with a short spine; stipules large and winged; spike dense, many-flowered. This is a handsome Pond-weed. Its large clear olive-green membranous leaves have wavy edges, and are beautifully veined. It is the largest of our native species, and forms masses in ponds, ditches, and rivers, where it is often abundant. We have, however, no species like the *P. serratum* of the Swiss lakes, which Haller describes as growing to the enormous length of from ten to twenty fathoms, forming a kind of forest in their waters. Our Shining Pond-weed bears cylindrical spikes of green flowers, about two inches long, in June and July. Two sub-species are recognised: *P. zizii* and *P. decipiens*. The former has oblong floating leaves, somewhat leathery, and a very long stalk to the flowering spike; the latter has variable stalkless leaves, a denser spike on a stouter stalk.

15. **Small Pond-weed** (*P. pusillus*).—Leaves linear, acute, 1 to 3-ribbed, alternate, spreading at the base; stem thread-like, branched; spikes on very long stalks. This species is not infrequent in rivers, ponds, and ditches in July, when it bears its nearly globular few-flowered spikes of brownish-green. Its leaves are usually very narrow, and expanded at the base, of a dull green. A variety with broader leaves and compressed stem is the Flat-stalked Pond-weed (*P. friesii*) of some writers.

16. **Hair-leaved Pond-weed** (*P. trichoides*).—Stem hair-like; leaves bristle-like, rigid, with half-clasping base, 1 to 3-nerved, stipules slender and harp; flowers 3 to 6, very minute, only one producing fruit; flower-stalk curved, longer than the leaves. This slender species, nevertheless, attains a length of six or eight feet. It occurs in muddy drains and ditches in Norfolk, Suffolk, and Cambridge; also in the west of Ireland. It flowers from August to October.

17. **Grassy Pond-weed** (*P. gramíneus*).—Leaves linear, broad, alternate, sessile; stem compressed, forked; flower-stalks scarcely longer than the spikes or the stipule. This is a somewhat rare plant, inhabiting ponds and ditches, bearing a dense egg-shaped spike in July. Its leaves are of a full deep though bright green, with three nerves, and look like grass as they float on the water. It is also known as *P. obtusifolius*.

18. **Sharp-leaved Pond-weed** (*P. acutifólius*).—Leaves linear, taper, pointed, oval, compact, with three strong and numerous fine nerves, and half clasping the stem. This rare species has been found in lakes and ditches from Yorkshire to Dorset and Kent. It flowers in July.

19. **Grass-wrack-like Pond-weed** (*P. zosterœfólius*).—Leaves broadly linear, acute, with 3, rarely 5, strong and many fine nerves; spikes many-flowered, one inch long, cylindrical, upon long foot-stalks. This is a local plant, inhabiting rivers and lakes in the north and east of Britain, and in County Down. It flowers in July, and is larger than the last species. It is also known as *P. compressus*.

* * * *Leaves all submersed, without stipules.*

20. **Close-leaved Pond-weed** (*P. dénsus*).—Leaves opposite, egg-shaped, tapering to a point; stem forked; spikes 3 to 6-flowered. This species is rendered of easy recognition by its pellucid crowded leaves, which

overlap by their base, and turn backwards at the point. The small roundish green spike appears in July and August, and the plant is common locally in pools, ditches, and slow rivers, from the Forth of Clyde to Kent and Somerset; and in Ireland.

* * * * *Leaves all submersed, stipules sheathing.*

21. **Fennel-leaved Pond-weed** (*P. pectinátus*).—Leaves bristle-shaped, 1—3-ribbed, parallel, arranged in two rows; spikes interrupted. This plant varies much in the length and size of its stems and leaves, but is distinguished by its tuberous rootstock. It could not be confounded with any other species but the following, from which it differs chiefly in having its spikes less interrupted, and its fruit being smaller. The nut is also ribbed on the back, while that of the next is without ribs. It is of a bright green colour, resembling fennel, when lying in masses in the waters, and its stem is much branched. The spikes appear in July, are few in number, and slightly interrupted. It is a rare plant, inhabiting ponds, streams, and salt marshes. A form of this is recognised as a sub-species under the name of *P. flabellatus*.

22. **Slender-leaved Pond-weed** (*P. filifórmis*).—Stem thread-like; leaves hair-like, 1-nerved, sheathing by their stipules. This plant has spikes which are greatly interrupted, and grow on long foot-stalks. It flowers in June and July. It occurs in lakes and ditches at Anglesea, locally from Berwick northward; and in Ireland rarely.

RUPPIA (*Rúppia*).

Sea Ruppia, or Tassel-grass (*R. marítima*).—Stems long, slender, round, much-branched, leafy; leaves linear, opposite and alternate; perennial. This is a plant which, growing in salt-water pools and ditches, might at first be taken for the Fennel-leaved Pond-weed, *P. pectinatus*. It has slender, much-branched stems, scarcely thicker than a packthread, but a couple of feet long, and long slender bristly leaves with sheaths, which are often very conspicuous. But in July and August one may see plainly that this plant is not a pond-weed, but that it has a very peculiar structure. The greenish flowers of this Ruppia grow in pairs, on a spike, which is enclosed at first in a membranous sheath, and they have neither calyx nor corolla, but their two anthers are very large. Aquatic plants have mostly some means of raising themselves above the water during the time of flowering, and this process is effected in the Tassel-grass by means of the flower-stalk, which lengthens at this season to some inches, according to the depth of the water, and coils itself up in a spiral form, so as to reach the surface. The Rev. Gerard Edward Smith remarks upon this plant, that he observed the pollen scattered over the water, and the small yellow spikes rising above its level, many having already discharged their pollen, while in a few the elevated anthers were yet entire. He adds, "The anthers are vesicular and buoyant; as they swell and become mature, the membranous sheath enclosing them is distended, and the whole is brought to the surface of the water. The flower-stalks are rapidly lengthened, the flowers quit the sheath, which then becomes a bladder, and aids the elevation of the spike an inch above the water. Presently the anthers burst, the vesicle loses its buoyancy, and the flower-

1. LONG LEAVED POND WEED.
Potamogeton longifolius
2. SHINING P W.
P. lucens
3. VARIOUS LEAVED P W.
P. heterophyllus
4. LANCEOLATE P W.
P. lanceolatus
5. REDDISH P W.
P. rufescens
6. PLANTAIN LEAVED P W.
P. plantagineus
7. OBLONG L P W.
P. oblongus
8. SHARP FRUITED BROAD L P W.
P. natans.

stalks, bearing the fertilized stigma, sink within the bosom of the parent plant." He adds, that the spadix lengthened itself even when the plant was placed in a basin of water. The Tassel-grass is not uncommon in the pools of salt-marshes; except in west Scotland, where it is rare.

In the sub-species *R. rostellata*, the sheath is not inflated, the fruiting stalk is not coiled spirally, but is short and waved; it flowers earlier, and the fruit has a longer beak. A variety of this (var. *nana*) found in Orkney has stems which creep along under the mud, and the foot-stalks are very short.

3. Horned Pond-weed (*Zannichéllia*).

Common Horned Pond-weed (*Z. palústris*).—Flowers axillary; style half as long, and in one form quite as long as the fruit; leaves slender, opposite; annual. This plant is very abundant in brackish pools in various parts of the kingdom, except that it is rare in West Scotland. Its habit is to grow entirely submerged in water, having much the appearance of the Lesser Pond-weed, *P. pusillus;* but during its flowering season, which is from July to September, it is readily distinguished from that plant by its small green flowers seated in the axils of its leaves. Its long thread-like branched stems, a foot or a foot and a half long, form tangling masses. The stigmas of the plant are very remarkable for their broadly expanded, uneven, cup-like form. The capsules are dry and one-celled, bearing usually but one seed, and each has an awl-shaped termination, which makes it look something like a bird's claw. Mr. Baker recognises the following sub-species: *Z. brachystemon*, *Z. pedunculata*, and *Z. polycarpa*, based on minute differences in the floral organs.

4. Grass-wrack (*Zostéra*).

Broad-leaved Grass-wrack, or Sea-grass (*Z. marína*).—Leaves broad, linear, entire, nerved; spadix bearing numerous flowers; rootstock creeping, perennial. All who have observed the long bright leaves and flexible stems of the Grass-wrack, floating gracefully in the sea, will acknowledge the appropriateness of the scientific name, derived from the Greek *zoster*, a riband. The leaves are long and blunt, with sheathing bases of bright but rather deep glossy green. They grow from among mud at the base of rocks, and in sandy shallows, on sea-banks, and in salt-water ditches, sometimes covering acres of shallow water, and floating in pools among green laver and purple dulse, till some rough wave dashes over them, and, tearing up large masses, casts them upon the weedy shore. Sometimes the long leaves are seen floating above the mud right down in the deep sea, and seem welcomed by many a gliding little fish, or darting crustacean, or slow-moving mollusc, or quaint zoophyte—

> "Where 'neath your keel the verdant sea-grass waves."

It has, however, no affinity with the sea-weeds among which it floats; for it has roots, and leaves, and flowers, the green flowers forming two rows on one side of the spadix. It is destitute of calyx and corolla, but is provided with anthers and pistils, which grow alternately, and the numerous seeds ripen amid the salt waters in September. These are round and white, and

contain a farinaceous substance. The lower part of the stem, which is often tinted with reddish-brown, is of a sweet flavour. This Grass-wrack is very abundant on some parts of the coast; on those of Yarmouth, it is torn up by the waves, and strewn so profusely, that mounds are formed of its blackened stems and leaves for the purpose of resisting the encroachment of the sea. Mr. Gosse, describing the shores of Weymouth, says, "Between tide-marks the pebbles are washed clean by the surf, but along the line of high water there is a broad bank of black Sea-grass, the accumulation of years, perhaps ages, rotting into mould, and forming an admirable manure. It is, indeed, used for this purpose, being carried away by the farmers, where it is sufficiently abundant and sufficiently accessible. In the vicinity of Torquay and of Ilfracombe, I had not met with this substance in any appreciable quantity, but in Poole Harbour, the scene of my early life, I had been familiar enough with it, as its dirty littering banks, like a continuous dunghill, fringe the shores, the refuse of hundreds of acres of the grass that grows on the muddy flats of that land-locked harbour."

Both in Sweden and Holland this Sea-grass is very extensively used as a manure, and is preferred to hay for filling mattresses. It is sold in England by upholsterers under the name of *Alva marina*, which is probably a corruption of *Ulva*. It is sometimes used for thatch, and is said to last more than a century, often becoming quite bleached by exposure to sun and air. In sea-coast towns it is collected from the shore for packing earthenware and glass; and the rush-like coverings which surround the Italian liquor-flasks are made of this plant. Cows refuse to touch it, but it is eaten by horses and swine. Hugh Miller remarks of the Grass-wrack, that it is very susceptible to frost, and he says that he has seen large quantities nipped by it. The French call the plant *La zostère*, and the Germans, *Seetang*. A slender variety, growing in mud, with about half the number of nerves in its leaves, is sometimes termed *Z. angustifolia;* and a small plant, scarcely three inches long, with slender leaves, which have but one nerve, is described as *Z. nana*. Some botanists doubt if the three plants are truly distinct. In this dwarf Grass-wrack the nuts are described as smooth, while in the other kinds these are marked with fine lines. The dwarf plant grows in muddy salt-water pools in estuaries, but is rare.

5. Naias (*Naias*).

1. **Flexible Naias** (*N. flexilis*).—Stem thread-like, branched; leaves very slender, linear, with fringed sheaths, opposite or in whorls of 3; flowers solitary, or 2 or 3 together; berry one-eighth of an inch across. This is a very slender submerged perennial with brittle stems, and inconspicuous male and female flowers on the same plant. It flowers in August and September, and has been found in lakes in Perthshire, Skye, and Connemara.

2. **Greater Naias** (*N. marina*).—Stem branched sparingly, with a few teeth; leaves with strong spiny-teeth and entire sheaths; flowers solitary, the males and females on separate plants; berry, a quarter of an inch in diameter, purplish. This plant, which flowers in July, has been found in Hickling Broad, Norfolk. It is also known as *N. major*.

1. SEA RUPPIA.
   Ruppia maritima.
2. HORNED POND WEED.
   Zannichellia palustris.
3. BROAD LEAVED GRASS WRACK.
   Zostera marina.
4. DWARF GRASS WRACK.
   Zostera nana.
5. FLEXIBLE NAIAS.
   Naias flexilis.
6. SEA NAIAS.
   Naias marina.

Pl. 243.

GRASSES AND SEDGES

(SUB-CLASS II. GLUMACEÆ.)

GRASSES constitute an important part of the vegetation of most temperate countries, forming large masses of verdure on plains and hill-sides, and giving to the landscape that hue on which the eye can longest gaze untired, fringing the blue streams or crystal rills with their graceful leaves and flowers; or planted by the hand of man, in fields, ripening gradually from the delicate and tender blade of the spring cornfields into the rich brown of the full ear, which is to furnish our food. The Cereals, or corn grasses, are not natives of Britain; and of the large number of grasses which form the herbage of our fields, not more than twenty are fitted for the food of cattle. Many grasses grow even in water; some in running streams, others where the water is still. Some are peculiar to the mountains, others to the woodland; some to the sandy fields or shores, but not one will grow in the sea. Several grasses and sedges are invaluable, as, by the interlacing of their roots, they fix the ever-shifting sands; and without their aid we should often be overwhelmed by torrents of sand almost as fearful as those which appal the traveller in the desert. In other places grasses grow on upland and hilly ground, restraining there the falling of the loose soil, while the widespread down, the chalky cliffs, and the wall top are made green by their presence. Besides their individual uses, they, in their mass, influence the healthy condition of the surrounding neighbourhood, for wherever this verdant covering of the earth is found it materially affects the atmosphere, especially with regard to the quantity of moisture; while the air which sweeps over the grass, laden with all the deleterious gases borne away from the crowded city, sweeps back again to the mass of mankind dwelling there, charged with a fresh supply of oxygen breathed forth from blades of grass and from leafy boughs, and replaces that which is vitiated by the respiration of man and animals.

Perhaps the season when the sight of the green meadows most delights us is early spring. How beautiful are they, as the sunlight comes down upon their gleaming blades, and the blue heavens are hanging over them! Every day the grass seems to become taller, and thicker, and greener.

Multitudes of long slender leaves are blending with the foliage of various forms, which precede the spring and summer flowers, and

> "Grow like the summer grass, fastest by night,
> Unseen, yet crescive in its beauty."

This rapidity of growth adds much to the interest with which we look on nature at this season. The scene of to-day is even richer than that of yesterday. It may be that a storm, accompanied by heavy rains, pours over field and valley, and its torrents might seem destined to beat down the tender grass to earth, and to strip the bending twigs of all their wealth of leaves. Yet that storm shall but prepare the way for their quicker growth; for the electrical state of the atmosphere which follows it is, of all conditions, most favourable to the rapid increase of vegetation.

The grassy turf which makes our meadows so bright and beautiful, and which adorns the landscape also of other countries in the colder portion of the temperate zone, is almost entirely absent from those lands on which the sun shines with its fullest power. Even in Southern Europe, where meadow lands more seldom occur, there begins to be some assimilation in the general appearance of the grasses to the taller species of lower latitudes; and reeds, which are with us of moderate size, rival the tree-like grasses which form so characteristic a feature of tropical scenery. The species of grass found in warmer lands are mostly different from those of our country, though some genera—*Poa*, for instance—are very widely distributed, and some species of this genus are found in all varieties of climate. Wherever we find grasses, we see them growing more or less socially. Tropical grasses are not only taller than ours, but they have flowers more downy and elegant, and broader leaves. The noble plants of the Bamboo family rise to the height of trees, forming, both in tropical and sub-tropical zones, vast and impenetrable forests; their slender stalks, reclining branches, and tall grassy leaves, reminding the native of northern countries of the willows of his own land, yet far excelling these in grace and beauty. Taller than even alders and oaks, these tree-like grasses wave more gracefully before the winds than our sturdy trees can do, and give a cheerful and airy aspect to the forest by their light and tremulous motion, and their smoothly-polished yellow stems; while the gigantic sugar-cane family, though not so numerous, are scarcely less beautiful as they wave their silvery flowers so gracefully to the wind.

In these warm regions the want of green meadows is not felt. The "cattle on a thousand hills" of the colder climate, are not needed in these; and the great Creator has spread therefore no vast pastures for their supply. The Hindoo who can dine on a dish of plantain or of rice, would be injured by any great quantity of animal food, and is directed by instinct to a vegetable diet. A slight herbage rises up at all times of the year, after the sudden shower or the long-continued rain; and this being sufficient to supply food for the horses, no hay is made in the East. During the rainy season, there are, in some tropical countries, extensive tracts of grass; as, for instance, in the savannahs of America; but they are unmixed with wild flowers, such as our daisy, clover, and buttercup; they present no uniform mass of greensward, and are often as tall as the traveller who is passing through them. Grasses of various kinds are to be found in more or less abundance from the equator

1. SWEET CYPERUS.
Cyperus longus.

2. BROWN C.
C. fuscus

3. BLACK BOG-RUSH
Schœnus nigricans

to the poles. Several grasses, like the Alpine Foxtail, grow in the coldest regions in great luxuriance; and the Esquimaux, dwelling in the seventy-third degree of north latitude, has large patches of herbage green as an English meadow. Dr. Lindley remarks, "The great mass of herbage, known by the name of sedges and grasses, constitutes perhaps a twelfth part of the described species of flowering plants; and at least nine-tenths of the number of individuals composing the vegetation of the world."

Corn-fields are not less pleasing to our sense of beauty than grassy meadows; and, whether clad in the tender green of the spring blade, or the full brown of summer, enliven and enrich our landscape. Many grasses beside those which are cultivated, afford seeds equally nutritious, though smaller in size. Indeed, the wheat, on which we depend so largely for food, and the origin of which was, till lately, undiscovered, seems now proved, by M. Fabre's experiments, to be but the cultivated form of the Ægilops, a grass infesting barley-fields on the shores of the Mediterranean. The grass, when wild, produces very small grains; but this botanist found on sowing it, summer after summer, that a crop of good wheat finally arose from its seeds.

When we consider how small the grains of corn are, it seems wonderful that man should have ever cultivated the cereal grasses for his nourishment. No doubt, the earliest cultivators were influenced in their choice of plants by the social growth of the grasses; and so, observing men, finding that plants bearing these nutritive seeds grew together in great numbers, sowed them on lands where they were wanting—where they could be protected from injury, and whence they could be gathered in their season.

Wherever now we see a corn-field waving in beauty, whether in the climes of east or west, or by the quiet homesteads which lie among the hills and valleys of our native land, it tells of peace, civilization, and domestic happiness; it tells of homes. The men who sowed the grains from which sprung those towering blades are not wild wanderers over the earth. Man must have a spot to call his own, ere he will rise up early and work late, sowing the seed, or gathering in the ripened fruit; and the tillage of the earth brings with it softer manners, and gradual improvement in the arts and sciences of civilized life. The house is reared, and children learn beneath its roof the love of kindred, of neighbours, and of country; and agriculture proves the source alike of individual and of national prosperity.

A thorough knowledge of even the small number of grasses which adorn our meadows, fields, and woods will demand a little patient study. The genera and species are now, however, by the labours of successive botanists, so well understood, and can be described by characters so distinct, that the student, aided by the plates, will find little real difficulty in obtaining a good acquaintance with this interesting and useful tribe of plants. Some of the varieties require considerable attention, as those of some species are very different in appearance from the type from which they have varied; and some grasses described as species will probably yet be found to be but varieties, changed by accidental circumstances of soil or situation. With few exceptions, the characteristics of the grasses can be detected by the help of a good pocket-lens; although a few genera, like those of *Agrostis* and *Aira*,

in consequence of the small size of the spikelets, require examination with the microscope.

The term "grass," as employed by agriculturists, frequently has a far more extensive signification than that to which it is limited by the botanist, being applied to clover (called "three-leaf grass"), plantain, sorrel, and many other flowering plants, which ordinarily form a constituent part of a hay crop. This use of the word may be very convenient to those who, in their intercourse with each other, require some such comprehensive term which may include grasses and other plants fit for forming good pasture-land, or for being converted into hay; but the naturalist understands by "grass," such plants only as fall under the description given below of the GRAMINEÆ, a natural order of the sub-class GLUMACEÆ. To this division it is altogether improbable that the botanist, however elementary may be his knowledge, will assign any of the plants described in the preceding volumes; yet it is by no means so certain that the young student may not confound with the grasses other members of the Glumaceous Tribe belonging to the CYPERACEÆ, or Sedges; for these resemble the grasses so closely in their more obvious characters, that it requires a somewhat practised eye to discriminate them. The points in which the two natural orders agree are these:—the leaves are long, narrow, often channelled above, and pointed; they proceed mainly from the root, and grow in tufts: in both, the flowers are destitute of petals, being composed of scales or glumes, and are elevated on a straw-like stem, where they form terminal spikelets or heads, which are either erect or drooping. The characters in which the Sedges obviously differ from the Grasses are, that in the former the leaves are generally rigid and more or less of a sea-green or glaucous hue; the flower-stem is angular instead of round, solid or pithy, and not hollow, and not jointed at the point from which a stem-leaf arises; and in those cases in which the stem-leaf is furnished with a sheathing base, that sheath is never split. The separation of the two orders is therefore so clearly a natural one, that a practised eye can at once decide to which of the two divisions any given specimen should be referred, no matter what may be its stage of growth—and that without minutely examining that part (the inflorescence, namely) on which the distinction is in reality founded.

Not only in outward appearance, but in properties also, the sedges differ from the grasses. Growing often side by side, on dry heaths, in marshes, meadows, woods, on mountain tops, or on the sandy sea-shore, the grasses abound in starch and sugar, substances highly conducive to the nutriment of cattle; the sedges are remarkably deficient in them, and do not rank as "grass," even in the agricultural sense of the term; so that while the Glumaceæ comprise nearly all the plants which in the temperate regions are essential to man and the animals that he has domesticated, the Cyperaceæ are "weeds," unprofitable for food—and very frequently, like tares among wheat, appropriating soil and nourishment, which but for them would afford space and nurture for their more valuable neighbours. They must not, however, be denounced as utterly useless, nor are they even all to be classed with the "thorns and thistles"—which, in accordance with the primeval curse, conveyed by implication a blessing on industry; the roots of several species

1. PRICKLY TWIG RUSH
Cladium mariscus.
2. WHITE BEAK R.
Rhynchospora alba.
3. BROWN B. R.
R fusca.
4. BROAD LEAVED BLYSMUS,
Blysmus compressus.
5. NARROW L. R.
B. rufus.
6. CREEPING SPIKE RESH,
Eleocharis palustris.
7. MANY STALKED S. R.
E. multicaulis.
8. LEAST S. R.
E. acicularis.

are medicinal; the tubers of *Cypérus esculentus*, called by the French "Souchet comestible," or "Amande de terre," are used as food in the south of Europe, and are employed in the preparation of orgeat; and several species of the same genus are cultivated in India and China for the wholesome food afforded by their tubers, which are said to resemble potatoes or yams. Nor must we forget that to the tribe of CYPERACEÆ, or Sedges, belongs the *Papyrus antiquórum*, which furnished the simplest and earliest of writing materials. In our own country one species is employed in making baskets and chair-bottoms; and others are eminently useful in binding together, by their creeping roots, the wandering sea-sands, or strengthening the banks of rivers and canals against the encroaching action of the water. Owing to the minuteness of the parts of fructification, and the close affinity which exists between many of the species, they are difficult of discrimination, and require to be studied with patience and accuracy. It is hoped, however, that the following descriptions, which have been divested as much as possible of technical terms, will enable the reader, assisted by the plates, to determine the names of at least the most strongly-marked species.

The extensive and difficult genus *Carex*, is divided below into several groups; and the student is recommended, before he begins to compare his specimen with either description or figures, to satisfy himself thoroughly, as to which group, and to which division of a group, it should be referred; otherwise he may happen to grow bewildered and to fling down his plant in despair. He may also be warned against that unscientific habit of speaking of the Grasses and Sedges as though they were not Flowering Plants. The question of showiness has nothing to do with it. The point is that these plants equally with Wild Roses and Lilies bear stamens and pistils, and when the latter are fertilized by the former a true seed is developed from which a plant like the parent is produced directly. As we shall see, the process by which the ferns and their allies are propagated is entirely different.

ORDERS AND GENERA OF GRASSES AND SEDGES.

The large sub-class GLUMÁCEÆ (Glumaceous Plants) consists of two orders, CYPERÁCEÆ and GRAMÍNEÆ; the former, containing the Sedges and their allies; the latter, the true Grasses. They differ from ordinary flowering plants in having their stamens and pistils enclosed in husks or glumes, instead of calyx and corolla. Considerably over 5,000 species of this sub-class are known to science.

Order C. CYPERACEÆ—SEDGES AND THEIR ALLIES.

Flowers either with stamens and pistils, or with stamens or pistils only; the lower ones often neuter, that is, without either stamens or pistils; each flower enclosed within a single concave scale or glume; glumes imbricated round a common central column, forming a spikelet or head, each glume occasionally enclosing a membranous investment of the stamens and ovary; stamens 1 to 6, generally 3; anthers 2-celled, fixed by their base and open-

ing towards the pistil; ovary 1-celled, often surrounded by bristles, which are the representatives of the perianth-segments in the rushes and other plants; style 3-cleft, or rarely 2-cleft; stigmas undivided; fruit a 1-seeded nut. Most of the species are perennial.

* *Flowers with both stamens and pistils; glumes in two ranks.*

1. GALINGALE (*Cypérus*).—Spikelets in heads, umbels or panicles; glumes numerous in 2 ranks, keeled, nearly all fertile; bristles wanting. Name, the Greek name of the plant.

2. BOG-RUSH (*Schœnus*).—Spikelets in compressed terminal heads, 1—4-flowered; glumes 6—9, outer ones smaller, empty; bristles small, 1 to 6, or wanting. Name from the Greek *schoinos*, a cord, which was sometimes made from plants of this tribe.

* * *Flowers with both stamens and pistils; glumes imbricated on all sides.*

3. TWIG-RUSH (*Cládium*).—Glumes about 6 in a spikelet, the outer ones smallest, and all but one or two empty; bristles wanting; fruit a coated nut. Name from the Greek *klados*, denoting a twig.

4. BEAK-RUSH (*Rhynchóspora*).—Spikelets few-flowered; glumes about 6, the outer ones smaller and empty; bristles about 6, nut slightly flattened, crowned with the dilated base of the style. Name from the Greek *rhynchos*, and *spora*, signifying beaked-seed.

5. BLYSMUS (*Blysmus*).—Spikelets arranged in the form of a 2-ranked spike; glumes imbricated on all sides, the outer ones longer and empty; bristles several; nut slightly flattened on one side, gradually tapering into the hardened style. Name from Greek *blysmos*, a spring, near which plants of the genus grow.

6. SPIKE-RUSH (*Eleócharis*).—Spikelet many-flowered, solitary, terminal; glumes nearly all fertile, the outer largest; bristles 2—6, short; style 2—3-cleft, jointed to the top of the ovary; fruit crowned with the permanent base of the style. Name from the Greek *helos*, a marsh, and *chairo*, to rejoice.

7. MUD-RUSH (*Isólepis*).—Spikelets many-flowered, terminal; glumes nearly all equal and fertile; bristles wanting; styles 2—3-cleft, not thickened at the base, falling off; fruit slightly pointed, or not at all. Name in Greek denoting equal scales.

8. CLUB-RUSH (*Scirpus*).—Spikelets many-flowered, terminal; glumes equal, one or two of the outer sometimes barren; bristles 1 to 6; style 2—3 cleft, not jointed at the base, falling off; fruit slightly pointed, or not at all.* Name from the Celtic *cirs*, a cord.

9. COTTON-GRASS (*Erióphorum*).—Glumes imbricated on all sides, nearly equal; bristles finally assuming the form of long silky hair. Name from the Greek *erion*, wool, and *phora*, to bear.

* * * *Stamens and pistils in separate flowers.*

10. KOBRESIA (*Kobrésia*).—Spikelets few-flowered, all male, or the upper

* The plants contained in these three genera—*Eleócharis*, *Isólepis*, and *Scirpus*—are difficult of discrimination, and appear to be admitted to a new arrangement by every botanist that treats of them. That of Hooker and Arnott is here adopted.

1. FLOATING ISOLEPIS. *Isolepis fluitans*
2. BRISTLE STALKED MUD RUSH. *I. setacea*
3. SAVI'S M R. *I. savii*
4. ROUND CLUSTERED HEADED M R. *I. holoschœnus*
5. LAKE CLUB R. *Scirpus lacustris*
6. GLAUCOUS C R. *S. tabernæmontani*
7. TRIANGULAR C R. *S. triqueter*
8. SHARP C R. *S. pungens*

Pl. 216.

one bearing stamens, the lower a pistil, and included within a sheathing scale. Named after *De Kobres*, of Augsberg, a "patron" of botany.

11. SEDGE (*Cárex*).—Glumes collected into imbricated spikes; fertile flower of 1 pistil with 2—3 stigmas, invested by a pitcher-shaped sac, which is persistent and becomes the outer part of the fruit, enclosing the nut; barren flower of 3 stamens, corolla wanting. Name from the Greek *keiro*, to cut, from the sharpness of its leaves.

1. GALINGALE (*Cypérus*).

1. **Sweet or English Galingale** (*C. longus*).—Spikelets narrow, pointed, in erect twice-compound umbels; general bracts very long, leafy; partial, short; stem triangular; rootstock creeping. A handsome but very rare plant, found only in a few marshes in the south and west of England, and in the Channel Islands. The umbel is leafy and composed of unequal rays; the glumes are of a reddish-brown hue, with green keels and whitish margins; the stem is from 2—3 feet high, and is sheathed at the base with several long leaves, after the habit of the larger sedges. The root is succulent, and filled with a nutritive and agreeable mucilage, to which a highly aromatic bitter principle is added, having tonic and stomachic properties. It flowers in July and August. Its long curved bracts and gracefully mounted numerous heads give it a very striking appearance.

2. **Brown Cypérus** (*C. fuscus*).—Spikelets narrow, pointed, collected into small roundish terminal heads; glumes spreading; bracts 3, unequal. A small inconspicuous annual plant, only a few inches long, with fibrous roots and numerous trailing stems, first discovered in a meadow near Little Chelsea, where it is believed to have been naturalized, and since found on Shalford Common, near Godalming, Surrey. It flowers in August and September. The genus *Cypérus*, which, from the useful properties of many of the plants that it contains, has been with propriety selected to give a name to the order CYPERÁCEÆ, comprises little short of 700 species, nearly all of which inhabit the warmer regions of the globe, increasing in numbers and luxuriance as we approach the Line. The genus *Carex*, on the contrary, is more abundant in high latitudes, where, according to Humboldt, it equals the grasses, and towards the Tropics dwindles away and almost disappears. Of *Cypérus*, two species only are found in England; in Scotland none. The genus *Carex* contains upwards of sixty British species.

2. BOG-RUSH (*Schœnus*).

Black Bog-rush (*S. nigricans*).—The only British species. A rush-like plant, from eight to twelve inches high, composed of numerous erect, rigid, nearly round stems, some of which are barren, while others terminate in an abrupt head of dark red-brown, almost black glumes, of which the outer one assumes the form of a bract and overtops the rest. The stems are clasped at their base by several blackish sheaths, terminating in short rigid leaves. The short rootstock is branched, and bears many long tough fibres, which extend to a considerable distance in the turfy bogs where the plant grows. The flowers, which are somewhat conspicuous from their large yellow anthers,

appear in June. It is of local occurrence from Cornwall to Surrey, thence to the extreme north of Scotland; also in Ireland and the Channel Islands.

3. TWIG-RUSH (*Cládium*).

Prickly Twig-rush (*C. mariscus*).—The only British species. A tall and robust marsh-plant, 3—4 feet high, with a strong, cane-like stem and very long narrow leaves, which, at the edges and keel, are armed with minute recurved teeth, like those of a fine saw, and terminate in a tapering triangular point. The stem is nearly round and bears several leaves, and the numerous spikelets are arranged in the form of a compound leafy panicle. It inhabits marshes and fens throughout England, but is local, and is most abundant in Cambridgeshire. It is also plentiful in Galloway, Scotland. It flowers in July and August. There are usually about six glumes in a spikelet, of which only two or three bear flowers, and of these rarely more than one perfects fruit, which, when mature, is nearly as large as the spikelet.

4. BEAK-RUSH (*Rhynchóspora*).

1. **White Beak-rush** (*R. alba*).—Stem divided, leafy, each branch bearing an abrupt crowded cluster of spikelets; outer glumes scarcely overtopping the spikelets. A slender grass-like plant, with stems about a foot high, several of which proceed from one root, and are accompanied by long narrow leaves. The flowers are of a singularly white colour, recalling the hue of straw bleached by the sun. It flowers from July to August, and is not uncommon in peaty bogs.

2. **Brown Beak-rush** (*R. fusca*).—Stem leafy, bearing several oval heads of spikelets, which are overtopped by the leaf-like outer glumes. A rare plant, inhabiting bogs in Ireland and the south-west of England. In habit it resembles the last, but may at once be distinguished by its rich brown heads of flowers, which are accompanied by one or more long bracts, and its extremely narrow, almost bristle-like leaves. It flowers from July to August.

5. BLYSMUS (*Blysmus*).

1. **Broad-leaved Blysmus** (*B. compréssus*).—Stem somewhat triangular; spikelets 6—8-flowered; outer glume of the lowest spikelet with a leafy point; leaves flat and rough at the edges and keel.

2. **Narrow-leaved Blysmus** (*B. rúfus*).—Stem round; spikelets about 4-flowered; glumes all alike; leaves very narrow, smooth, channelled. The two species of *Blysmus* may be at once distinguished from all other CYPERÁCEÆ by bearing their spikelets arranged on opposite sides of the stem, after the habit of wheat, or rye-grass. The stem of *B. compréssus* is from 6—8 inches high, and it grows in boggy pastures, often near the sea. *B. rufus* is more slender and rigid, and is found in similar situations. Both species flower in July, but their range in this country is not the same: *B. compréssus* extending only from Kent and Somerset as far north as the Forth and the Clyde; whilst *B. rúfus* may be found from the extreme north of Scotland, but only as far south as North Wales and Lincoln. The latter species also occurs in the north of Ireland. Both species are included by some authors in the genus *Scirpus*.

1. BLUNT EDGED CLUB RUSH
Scirpus carinatus
2. SALT MARSH C. R.
S. maritimus.
3. WOOD C. R.
S. sylvaticus
4. CHOCOLATE-HEADED C. R.
S. paucifloras
5. SCALY STALKED C. R.
S. cæspitosus

Pl. 217.

6. SPIKE-RUSH (*Eleócharis*).

1. **Creeping Spike-rush** (*E. palústris*).—Stigmas 2; fruit crowned with the flattened base of the style, shorter than the 4 to 6 bristles. A rush-like plant, 2—3 feet high, destitute of leaves, and sending up from its widely-creeping rootstock many tufts of rounded stems, abruptly sheathed at the base, each of which terminates in a solitary oblong, red-brown spikelet. The dark glumes have a green keel and a pale edge, whilst the lowest one is almost round, and half clasps the base of the spikelet. Sides of lakes and ponds, common, flowering in June. There is a sub-species, *E. uniglumis*, with brown glumes, whose pale margins are narrower, and the lowest glume oval, almost entirely clasping the base of the spikelet. This is not so common as the typical form.

2. **Many-stalked Spike-rush** (*E. multicaúlis*). — Stigmas 3; fruit crowned with the triangular base of the style, longer than the 5—6 bristles. Resembling the last, but smaller. The leaf-sheaths appear as though cut short obliquely; the glumes are less pointed and the margins narrower. The author has found specimens the spikelets of which are viviparous, and bear plants furnished with roots and embryo spikelets. Flowering at the same time, and in similar situations, with the last.

3. **Least Spike-rush** (*E. aciculáris*).—Stigmas 3; fruit crowned with the almost globose base of the style; bristles 1—3; stems numerous, tufted, round, exceedingly slender. A humble plant, 3—4 inches high, frequent among other marsh plants on the sides of lakes and in damp heathy places; rare in Scotland. It approaches in habit *Isólepis sávii* and *I. setácea*, from which, however, it may be at once distinguished by the absence of bracts. It flowers from June to August.

7. MUD-RUSH (*Isólepis*).

1. **Floating Mud-rush** (*I. flúitans*).—Spikelet solitary, terminal; stigmas 2; stem floating, flattened, branched. A tufted grass-like aquatic, with numerous zigzag stems 3—18 inches long, short sheathing leaves an inch or two long, and small ovate pale green spikelets, flowering from June to August. Common in lakes, ponds, and marshes.

2. **Bristle-stalked Mud-rush** (*I. setácea*).—Spikelets 1—3, with an erect bract at the base, which greatly overtops the spikes; stigmas 3; fruit longitudinally ribbed and transversely striated. A humble plant, 3—6 inches high, forming dense clumps of very slender stems, which are leafy at the base. Common in wet gravelly places, and flowering in July and August.

3. **Savi's Mud-rush** (*I. sávii*).—Spikelets 1—3, with 1 or 2 spreading bracts, of which the longer slightly overtops the spikes; stigmas 3; fruit dotted, not furrowed. Closely resembling the last, from which, however, it may well be distinguished by the above characters, by its larger size, and by its brighter green hue. It is common in the west of England, where it inhabits bogs, and is found also in Scotland and Ireland, generally near the sea. Of late years it has been commonly exposed for sale in Covent Garden Market. Planted in a pot, and set to stand in a saucer of water, it soon fills the pot with innumerable evergreen bristling stems, which spread in all

directions, and present a very pleasing appearance. The roots, meanwhile, penetrate into the saucer, which they line with a tangled mass of fibres. In its wild state it flowers in July and August.

4. **Round cluster-headed Mud-rush** (*I. holoschœnus*).—Spikelets collected into globular heads. A distinct and very handsome rush-like plant, with round robust stems, 3—4 feet high, from about six or eight inches below the summit of which proceeds a panicle of six to twenty globular heads, of the size of small marbles, accompanied by a long spreading or deflexed bract. Said to grow on the sandy coast of Somerset and Devon, though no specific locality appears to be named but Braunton Burrows, an extensive tract of sand on the north coast of Devon, and Berrow, Somerset. Here it undoubtedly grows, but can scarcely be discovered without some labour and difficulty, owing to the tangled jungle of grass and rushes, which must be penetrated and searched by the botanist. The Berrow station, discovered by Mrs. E. S. Gregory in 1896, affords a small, depauperate form. It flowers in August and September. By some authors *Isolepis* is merged in *Scirpus*.

8. Club-rush and Bulrush (*Scirpus*).

* *Spikelets numerous; stem round.*

1. **Common Bulrush** (*S. lacústris*).—Spikelets forming a dense compound terminal panicle; glumes notched and fringed, smooth. Margins of lakes and in running water abundant, varying, according to the depth of the water, from 4—8 feet high. This is one of the few British Cyperáceæ applied to any economical purpose, being often made into mats, and, when twisted, being also used to form the seats of what are called rush-bottomed chairs. Coopers employ them in the caulking of casks. Many persons are in the habit of applying the term "Bulrush" to any tall rush-like aquatic, especially to plants of the genus *Typha*, to which last the name Reed-mace is far more appropriate. It flowers from June to August, and is generally distributed throughout the British Isles.

2. **Glaucous Bulrush** (*S. tabernæmontáni*).—Spikelets forming a loose compound terminal panicle; glumes notched and fringed, rough. Closely resembling the last in habit, but much smaller, seldom exceeding the height of two feet, and readily distinguishable by the glaucous hue of its stems. In the west of England it is far the commoner species of the two, and is very abundant on the banks of the Clyde. It grows also in many other places, especially near the sea, and flowers from June to August. Some botanists regard it as a sub-species of *S. lacustris*.

* * *Spikelets numerous; stem triangular, leafless above; stigmas* 2.

3. **Triangular Club-rush** (*S. triqueter*).—Spikelets clustered, some stalked, overtopped by the acutely triangular, usually leafless, stem; glumes notched, the lobes ending in a little point. Muddy banks of the Thames near London, in the river Arun, Sussex, and from thence to Cornwall. It grows from 3—4 feet high, and flowers in June and July.

4. **Sharp Club-rush** (*S. pungens*).—Spikelets about 3, sessile, surmounted by the acutely triangular stem; glumes notched, the lobes acute;

1 ALPINE COTTON GRASS
Eriophorum alpinum
2 HAIR-TAIL C G
E. vaginatum
3 ROUND-HEADED C G
E. capitatum
4 BROAD-LEAVED C G
E. latifolium
5 NARROW-LEAVED C G
E. angustifolium
6 SLENDER C G
E. gracile

Pl. 218.

leaves 2 or 3, channelled and keeled. Found only on the banks of St. Ouen's Pond, Jersey; flowering in June and July.

5. **Blunt-edged Club-rush** (*S. carinátus*).—Stem round below, obtusely triangular above; spikelets in a compound terminal panicle. Growing in muddy tidal waters in Middlesex, Kent, and Cornwall, where it attains a height of 2—4 feet; very rare, flowering in July and August. Like *S. tabernæmontani*, this is by some regarded as a sub-species of *S. lacustris*.

* * * *Spikelets numerous; stem triangular, leafy; stigmas* 3.

6. **Salt-marsh Club-rush** (*S. marítimus*).—Spikelets arranged in several stalked and sessile clusters; bracts several, long and leafy. Common in salt marshes on most parts of the coast, where it flowers in July and August, forming large grassy tufts of long keeled and channelled leaves, which frequently overtop the clusters of brown spikelets. Both leaves and stems are very harsh to the touch.

7. **Wood Club-rush** (*S. sylváticus*).—Spikelets forming a many-times-compounded terminal panicle; bracts several, very long, leaf-like. Moist woods, most frequent in the south of Scotland, but abundant also in South Kent, and occasionally met with on the banks of the Tamar, Devonshire. A robust and handsome species, 3—4 feet high, with broad and flat leaves, and a very large number of small green spikelets, clustered together in groups of three or four. It flowers in July.

* * * * *Spikelets solitary, terminal; stigmas* 3.

8. **Chocolate-headed Club-rush** (*S. pauciflórus*).—Stem round; sheaths leafless; two outer glumes obtuse, shorter than the spike, usually awned. Boggy moors and commons in Scotland, and several parts of England. The stems are 4—10 inches high, resembling in habit those of *Eleócharis palústris*, but well distinguished by the above characters, as well as by the differently formed fruit. It flowers in July and August.

9. **Scaly-stalked Club-rush** (*S. cæspitósus*).—Stem nearly round; sheaths with narrow awl-shaped leaves; two outer glumes acute, longer than the shining brown spikelet. Moist heaths, common. A small plant, 2—4 inches high, with numerous erect stems, many of which bear no spikelets. "This plant is called *Deer's Hair* in the Highlands, and yields an abundant food to sheep on the mountains in spring."—*Sir W. J. Hooker.* It flowers in June and July.

10. **Least Club-rush** (*S. parvulus*).—Stems grooved; sheaths thin, glassy and inconspicuous; leaves bristle-like, channelled, dilated at base. Spikelets pale and minute. This plant, which grows on sandy seashores in Hampshire, Dorset, Devon, and Wicklow, is a very small one, its full height not exceeding a couple of inches. Its rootstock is hair-like, and creeps along in the sand, throwing up distant tufts of a few stems and leaves. It flowers in July.

9. Cotton-grass (*Erióphorum*).

* *Spikelet solitary.*

1. **Alpine Cotton-grass** (*E. alpínum*).—Stem triangular, rough; leaves bristle-like, much shorter than their sheaths; spikelet oblong, few flowered;

glumes yellow-brown. An elegant little plant, which formerly grew in the Moss of Restenet, near Forfar, but has disappeared in consequence of the moss being drained.

2. **Hare's-tail Cotton-grass** (*E. vaginátum*).—Stem round below, triangular above; lower sheaths of the stem terminating in long leaves, upper one leafless, inflated; spikelet oblong, many-flowered. A strikingly handsome plant, from 12—14 inches high, not unfrequently found in great abundance on damp moors, where it flowers in spring, but is made conspicuous later in the season by the enlarged bristles of the flower, which assume the appearance of white floss-silk. Each spikelet is about an inch and a half in diameter on a slender stalk, three-fourths of the upper portion of which is naked. Near the base is a loose striated sheath, and the very narrow leaves which clasp the stem are furnished with sheaths of the same character.

3. **Round-headed Cotton-grass** (*E. capitátum*).—Stem round throughout; lower sheaths bearing short leaves, upper one leafless. Resembling the last in habit, but smaller. Once reported by Mr. G. Don, from a rivulet on Ben Lawers, near perpetual snow. It flowered late in summer.

* * *Spikelets more than one.*

4. **Broad-leaved Cotton-grass** (*E. latifólium*).—Stem hollow, tufted, upper half triangular; stalks of the spikelets rough; leaves flat, becoming triangular above the middle. Flowering in May and June, in boggy ground; rather rare.

5. **Narrow-leaved Cotton-grass** (*E. angustifólium*).—Stems not tufted, round, or nearly so, solid; stalks of the spikelets smooth; leaves becoming triangular above the middle. Boggy and peaty ground, common; flowering in May and June.

6. **Slender Cotton-grass** (*E. grácile*).—Stem slightly triangular; stalks of the spikelets downy; leaves triangular throughout, channelled. Boggy ground, rare. This species grows near Hagnaby, Yorkshire, at Whitemoor Pond, near Guildford; on Ben Lawers and the Clova Mountains; and at Cwm Idwell, North Wales. It flowers in July.

Great difference of opinion exists among botanists as to the number of species to which the many-spiked Cotton-grasses should be reduced. The three above described appear to be distinct; and if the number and comparative length of the bristles be taken into consideration, several others may be added. *E. latifolium* and *E. angustifolium* together form the *E. polystachion* of Linnæus. *E. angustifólium* is by far the most common, and, without doubt, the most beautiful. Enlivening, as it frequently does, extensive tracts of moorland with its silky tufts, too delicate apparently to bear the gentlest breeze, yet bending unhurt before the sweeping gale, it converts the desert waste, as it were, into a flower-garden. For, though it is not in its perfect beauty until its seeds are matured, the heads of dazzling white down have on the landscape the effect of flowers, and might be mistaken at a distance for clusters of gigantic snowdrops, springing from a strange soil at a season yet more strange. It grows from twelve to eighteen inches high. With the silky substance which invests the seeds, paper and wicks of candles have been made and pillows stuffed.

1. COMPOUND HEADED KOBRESIA
Kobresia caricina.
2. CREEPING SEPARATE HEADED CAREX
Carex dioica.
3. PRICKLY S-H C.
C. davalliana.
4. FLEA C.
C. pulicaris.
5. ROCK C.
C. rupestris.
6. FEW FLOWERED C.
C. pauciflora.
7. CURVED C.
C. incurva.
8. OVAL SPIKED C.
C. ovalis.
9. LITTLE PRICKLY C.
C. stellulata.
10. WHITE C.
C. curta.
11. HARE'S FOOT C.
C. leporina.
12. ELONGATED C.
C. elongata.
13. DISTANT SPIKED C.
C. remota.

Pl. 243.

10. KOBRÉSIA (*Kobresia*).

Compound-headed Kobresia (*K. caricína*).—An unpretending little plant, with the habit of one of the lesser Sedges, or the short robust form of Sheep's Fescue-grass. The stem is erect and rigid, from 6—12 inches high. The spikelets, each of which contains two flowers, are collected into four or five small spikes, and these are aggregated at the summit of the stem. The fertile flower contains one pistil with three stigmas; the barren, three stamens. The lowest bract is somewhat larger than the rest; the nut is obscurely triangular, and is included within the sheathing scale. The leaves are much shorter than the stem, tufted and curved. It grows, forming densely tufted masses, on moors in the North, and flowers in August. Some botanists describe it under the name of *Elýna caricína*.

11. SEDGE (*Cárex*).

i. *Spikelet simple, solitary. Stigmas* 2.

* *Stamens and pistils on different plants.*

1. **Creeping Separate-headed Sedge** (*C. dioíca*).—Fertile spikelet egg-shaped; glumes obtuse; fruit ascending or horizontal (not deflexed); barren spikelet slender; leaves and stem smooth; rootstock creeping. A slender plant, about 6 inches high, growing in spongy bogs, and flowering in May and June. Not common.

2. **Prickly Separate-headed Sedge** (*C. davalliána*).—Fruit tapering to a point, rough, deflexed; leaves and stem rough; rootstock tufted. Resembling the last, and about the same size. It formerly grew at Lansdown, near Bath, but has been long extinct.

* * *Stamens and pistils in separate flowers on the same spikelet.*

3. **Flea Sedge** (*C. pulicáris*).—Spikelet slender, the upper half bearing stamens, the lower pistils; fruit tapering to a point at each end, glossy, at first erect, finally deflexed. A pretty little plant, from 6—10 inches high, common in bogs and on moist moorlands. The slender stem, scarcely thicker than a horsehair, bears from six to twelve shining brown seeds, which are distant from each other, and when ripe bear a strange resemblance to insects, clustering like aphides round the stem. The upper portion of the spikelet which bears the stamens remains unaltered. The leaves are tufted, long, and bristle-shaped. It flowers in May and June.

ii. *Spikelet simple, solitary. Stigmas* 3.

4. **Rock Sedge** (*C. rupéstris*).—Spikelet very slender, with the upper half barren, and a few fertile flowers at the base; fruit triangular, brown, erect; leaves flat, terminating in a long curling point; rootstock creeping and sending off runners. A very rare plant, from 3—6 inches high, growing on shelves of rocks in the Highlands, at an altitude of over 2,000 feet, and flowering in July. It has been recorded from Aberdeen, Forfar, Perth, and Sutherland.

5. **Few-flowered Sedge** (*C. pauciflóra*).—Spikelet of from four to six

flowers, the two upper barren; fruit tapering to a very long point, nearly cylindrical, deflexed; leaves flat, much shorter than the stem. Not unlike *C. pulicáris*, from which, however, it may at once be distinguished by its much more slender fruit, which is of a pale yellow colour, and by its shorter leaves, in addition to the difference in the number of stigmas. It is not unfrequent in the Highlands, where it grows in moory places, and has also been found as far south as Yorkshire. It flowers in June.

iii. *Spike compound, some flowers in each spikelet bearing stamens (barren), and some pistils (fertile). Stigmas 2.*

* *Spikelets crowded into a head.*

6. **Curved Sedge** (*C. incúrva*).—Spikelets barren above, fertile below, crowded into a roundish head. A well-marked and rare species, inhabiting sandy seashores in the north of Scotland. The rootstock creeps extensively an inch or two beneath the surface of the sand, sending up, at intervals of two or three inches, one or more tufts of leaves and a head of flowers, which last, as it approaches maturity, bends down until it touches the sand. The roots, which are long, fibrous and tufted, issue from the main stem nearly opposite the leaves. The heads are large, but are rarely elevated more than two inches from the ground. Flowering in June.

* * *Spikelets alternate, barren at the base, fertile above.*

7. **Oval-spiked Sedge** (*C. ovális*).—Spikelets 5—6, oval, 1 terminal, the rest inserted, about half the length of a spikelet, one below another; fruit as long as the calyx, ovate, with a rough membranous margin tapering to a point which is 2-cleft. Common in marshy places. A somewhat slender plant with long grassy leaves, triangular stems, and brownish-green shining spikelets, without conspicuous bracts. It flowers in June and July.

8. **Little Prickly Sedge** (*C. stellulàta*).—Spikelets 3—4, roundish, rather distant; fruit angular, with a long beak, rough at the margin, spreading when ripe. Marshy ground, common. A slender plant from 12—18 inches high, with long grassy leaves, well distinguished by its roundish spikelets or fruit, which grow about 7—8 together, each in the form of a star. It flowers in May and June, and is also known as *C. echinata*.

9. **White Sedge** (*C. cúrta*).—Spikelets 5—6, rather distant, especially the lower ones; fruit elliptical, with a very short beak, about equal in length to the glumes. A slender plant from 12—18 inches high, having something of the habit of *C. ovális*. The spikelets, however, are not more than half as large, more distant; and the glumes are of a peculiar whitish hue, with green keels. It grows in bogs, but is rare, and flowers in June,

10. **Hare's-foot Sedge** (*C. leporína*).—Spikelets 3, rarely 4, ovate, crowded; fruit elliptical, tapering to a point, equalling in length the ovate obtuse scales. A very rare plant found at an altitude of 3,600 feet on the west side of Loch-na-gar, with a stem from 4—8 inches high, smooth and triangular. The glumes are reddish, with the margins paler; fruit yellow. Also known as *C. lagopina*.

11. **Elongated Sedge** (*C. elongáta*). — Spikelets numerous, oblong, rather distant; fruit oblong, tapering to a point, scarcely beaked, but bear-

1. AXILLARY CLUSTERED CAREX
   Carex axillaris.
2. BOENNINGHAUSENS C.
   C. boenninghausenana.
3. GREAT PANICLED C.
   C. paniculata.
4. PARADOXICAL C.
   C. paradoxa.
5. LESSER PANICLED C.
   C. teretiuscula.
6. GREAT C.
   C. vulpina.
7. GRAY C.
   C. divulsa.
8. GREATER PRICKLY C.
   C. muricata.
9. SEA C.
   C. arenaria.

Pl. 250.

ing the persistent style, longer than the glumes. Marshes, rare, from Yorks to Kent and Sussex. A stoutish plant 1—2 feet high, with acutely triangular stems, which are rough, as well as the leaves. The glumes are brown, with a greenish keel and white edges. Upper spikelets crowded; lower, distant from one another, about their own length. Flowering in June.

12. **Distant-spiked Sedge** (*C. remóta*).—Spikelets several, all single, approximate towards the top, but very distant below; fruit oblong, ovate, acute, the beak deeply 2-cleft; bracts very long, overtopping the stem. Moist places, common. A slender plant, from a foot to a foot and a half high, with from 6—8 small pale green spikelets and very long narrow leafy bracts, the lowest of which overtops the stem several inches; the upper ones are gradually shorter. It flowers in June.

13. **Axillary-clustered Sedge** (*C. axillàris*).—Spikelets several, the upper ones single, close together, the lower in distant groups of two or more; fruit oblong, ovate, acute, the upper part serrated, the beak deeply 2-cleft; bract of the lower compound spikelet longer, the others shorter than the spikelets; glumes shorter than the fruit. Marshes. A rare species, well distinguished by the above characters from the foregoing, which it resembles in many respects. Flowers in June. Hooker *fils* regards this and the next as forms of *C. remota.*

14. **Bœnninghausen's Sedge** (*C. bœnninghausenìana*). — Spikelets several, the upper ones simple, close together, the lower distant, compound; fruit narrow, tapering to a point, the upper part serrated; bract of the lower compound spikelet overtopping the stem; glumes equalling the fruit. Marshes, rare. Closely allied to the preceding. It flowers in June.

* * * *Spikelets alternate, barren at their extremity, compound.*

15. **Great Panicled Sedge** (*C. paniculáta*).—Spike compound, consisting of numerous ovate stalked spikelets, which are themselves compound; fruit flat on one side, convex on the other, many-nerved, and ending in a winged triangular beak; stem rough, triangular, with flat sides. A common and picturesque plant, from 4—5 feet high, inhabiting spongy bogs, where it forms elevated tussocks or tufts, 3 or 4 feet in diameter, after the habit of *Aira cæspitósa*, and of much service in consolidating the soil. The leaves are long, broad, and very rough at the margins. It flowers in June.

16. **Paradoxical Sedge** (*C. paradóxa*).—Spike compound, narrow; fruit much the same as in the preceding, except that the beak is not winged; stem rough above, triangular, with convex sides. Resembling the last in habit, but much smaller, being from 1—2 feet high, very rare, having been found in bogs only in Yorkshire, Middlesex, Norfolk, and near Mullingar. It flowers in July. It is classed by Hooker as a sub-species of *C. paniculata.*

17. **Lesser Panicled Sedge** (*C. teretiúscula*). — Spike compound, oblong, consisting of numerous crowded spikelets; fruit resembling that of *C. paniculáta*; stem like that of *C. paradoxa.* Boggy meadows, rare, June. Resembling in many respects *C. paniculáta* but very much smaller. Root-stock creeping, forming less decided tussocks.

18. **Great Sedge** (*C. vulpína*).—Spike cylindrical, consisting of numerous crowded compound spikelets; fruit large, terminating in a long rough beak;

stem acutely triangular. Wet places, common. A robust plant 2—3 feet high, with broad leaves, which are so rough at the margins as to be dangerous to meddle with; the stem is equally rough, and terminates in heads of fruit, which, when ripe, point in all directions. It flowers in June.

* * * * *Spikelets alternate, barren at their extremity, simple.*

19. **Greater Prickly Sedge** (*C. muricáta*). — Spikelets from 4—6 crowded; bracts nearly all shorter than the spikelets. Gravelly pastures, frequent. So closely resembling the next in all respects, that the two are very difficult of discrimination, if indeed they do not represent two forms of the same plant varied by soil and situation. Flowering in May and June. The var. *pseudo-divúlsa* is intermediate between this and the next.

20. **Grey Sedge** (*C. divúlsa*).—Spikelets about 6, the lower ones distant; lower bracts rather longer than the spikelets, bristle-shaped; fruit large, pointed, roughish near the extremity. A slender species, with long narrow rough leaves, growing from 1—2 feet high, and remarkable for its greyish hue. Frequent in moist shady places, and flowering in May and June. Evidently a sub-species of *C. muricata.*

21. **Sea Sedge** (*C. arenária*).—Spikelets of three kinds, upper barren, lower fertile, intermediate ones barren at their extremities, forming an oblong, acute, interrupted head; lower bracts longer than the spikelets. A very distinct species, abundant on the sandy sea-shore, where it is of great service in preventing the shifting of the sands; it also occurs inland in Norfolk, Suffolk, and Surrey. The rootstocks creep to a great distance a few inches below the surface. They are about as large as whipcord, and are invested with the remains of old leaf-sheaths, presenting a jointed appearance. From these, tufts of leaves and flowers arise at intervals of a few inches, and from the joints descend tufted fibrous roots, with here and there a stouter cord-like root which penetrates to a great depth; the leaves are rigid, rough at the edges, and of a glaucous hue; the stems are also rough above, and from 6—12 inches high, flowering in June.

22. **Soft Brown Sedge** (*C. intermédia*).—Spike composed of numerous ascending acute spikelets, of which the upper and lower are fertile, the middle barren; lower bracts longer than the spikelets. Marshes and wet meadows common. Bearing in many respects a close resemblance to *C. arenária*, yet perfectly distinct: it attains double the height, the leaves are more grass-like and the mature spike is singularly marked by being separated into two portions by the remains of the barren spikelets. Indeed, at all stages of its growth, the middle portion of the spike differs in appearance from the two extremities, by which peculiarity it may be distinguished from all other British Sedges. It flowers in June. Also known as *C. disticha.*

23. **Bracteated Marsh Sedge** (*C. divísa*).—Spike oblong ovate, composed of several spikelets, the lower one of which is furnished with a slender leaf-like bract. A slender plant about a foot high, with light green grass-like leaves, and a creeping rootstock; inhabiting marshy places, especially near the sea, principally on the southern and eastern coasts, and not extending north of Yorkshire. It flowers in May and June.

1. SOFT BROWN CAREX. Carex intermedia.
2. BRACTEATED MARSH C. C. divisa.
3. CLOSE HEADED ALPINE C. C. vahlii.
4. HOARY C. C. canescens.
5. BLACK C. C. atrata.
6. COMMON C. C. vulgaris.
7. RIGID C. C. rigida.
8. STRAIGHT LEAVED WATER C. C. aquatilis.
9. SLENDER SPIKED C. C. acuta.
10. TUFTED BOG C. C. cæspitosa.

Pl. 251.

iv. *Terminal spikelet fertile above, barren below; the rest fertile. Stigmas* 3.

24. **Close-headed Alpine Sedge** (*C. váhlii*).—Spikelets 3—4, clustering; fruit obovate, rough above, longer than the glumes. Very rare, on rocks in Aberdeenshire and Forfarshire at altitudes between 2,400 and 2,600 feet. Well marked by its dark purple-brown spikelets, the lower ones being nearly round when in fruit, and accompanied by a short leafy bract; the upper spikelet is cylindrical and more pointed. The stem, which is triangular, is from 6—12 inches high. It flowers in July. Also known as *C. alpina*.

25. **Hoary Sedge** (*C. canéscens*).—Spikelets 3—5, sessile except the lowest, which is stalked; stem triangular, leafy below. A very rare species from 1—2 feet high, found only on a small island in Lough Neagh, Ireland, flowering in July. Also known as *C. buxbaumii*.

26. **Black Sedge** (*C. atráta*).—Spikelets 4—6, ovate, stalked, finally drooping. A rare species, found on Snowdon and on alpine rocks in Westmoreland, and the Highland mountains, at altitudes between 2,400 and 3,700 feet. It attains the height of about a foot, and is remarkable for its unusually broad, flat, keeled leaves, and the dark purple-brown hue of its glumes. It flowers in June.

v. *One (or sometimes two) terminal spikelets, barren; the rest fertile.*
* *Stigmas* 2.

27. **Three-nerved Sedge** (*C. trinérvis*).—Spikelets close, fertile ones 2 or 3, sessile, oblong or cylindrical, lower bract slender, longer than the spikelet, not sheathing; glumes brown with green midrib; fruit lentil-shaped, brown, dotted; leaves smooth, keeled, as long as or longer than the smooth 3-sided stem. This is a stout species with thick roots, and long scaly rootstocks from which runners branch off. It varies in height from 6 inches to a foot, and the leaves are of the same length or longer. Its distribution in this country is restricted to the coast of Norfolk, where it may be found in wet sandy places, and flowering in July and August.

28. **Common Sedge** (*C. vulgáris*).—Spikelets from 3—5, cylindrical; bracts leafy, dilated at the base, and forming small round dark auricles; glumes obtuse, dark purple-brown; fruit elliptical, with a very short beak. Common in marshes and wet pastures, where it flowers in May and June, growing about a foot high, with a slender, acutely triangular stem, which is rough towards the top; leaves long and slender. Also known as *C. goodenovii*.

29. **Rigid Sedge** (*C. rígida*).—Spikelets oblong, 3—5; lower bract leafy, longer than its spikelet, with small round black auricles; glumes obtuse, black. On mountains from North Wales and Yorkshire northwards; also in the west and north of Ireland. It grows from 4—6 inches high, forming numerous tufts of rigid acute leaves, which are as long as the stem. It flowers in June and July.

30. **Straight-leaved Water Sedge** (*C. aquátilis*).—Spikelets long and slender, tapering towards the base, and often having barren flowers at the extremities; stem stout, stiff, and smooth, usually triangular; leaves long

and straight. Very rare. Bogs and marshes in Scotland, where it flowers in July and August.

31. **Slender-spiked Sedge** (*C. acúta*).—Spikelets long and slender, the lower ones frequently barren at the top; bracts very long, leafy, frequently over-topping the stem; auricles lengthened, pale. A large species from 2—3 feet high, with broad flat leaves, which are inserted in three rows, and stout stems, which are acutely triangular and rough. The fertile spikelets are very long, and droop. Frequent in marshes and moist pastures, where it flowers in May.

32. **Tufted Bog Sedge** (*C. cæspitósa*).—Spikelets cylindrical, the lower ones often barren at the top; lower bract leafy, not longer than the spikelet; auricles long, pale. Marshes, local, south of the Clyde, and in Ireland. Approaching the last, but growing in more decided tufts; the leaves, too, are narrower, and have a glaucous hue. It grows from 2—3 feet high, and flowers in April and May. Known also as *C. stricta.*

33. **Russet Sedge** (*C. saxátilis*).—Fertile spikelets ovate, obtuse, the lower one stalked; bracts leafy; fruit inflated, spreading, beaked. A distinct species, well marked by the above characters, as well as by its triangular, pointed leaves, and very dark fruit. Rare, near springs on the Scottish mountains, northwards of Ben Lomond, at altitudes between 2,500 and 3,300 feet. It attains the height of a foot or more, flowering in June. Hooker regards it as a sub-species of *C. vesicaria.*

34. **Cord-rooted Sedge** (*C. chordorrhiza*).—Spikelets crowded in an ovate head, barren above; fruit ovate, swollen, smooth and shining, yellowish with brown ribs, ending in a two-pointed beak; nut pale yellow, dotted, and with slender beak almost as long as the nut. This rare species has recently been found by the Rev. E. S. Marshall, F.L.S., and Mr. Shoolbred in wet peat-bogs at Altnaharra, in West Sutherland, where it grew half buried in Sphagnum-moss. It has very long and wiry underground stems, which send up leafy branches and flowering stems at intervals, and these attain the height of six inches or a foot. The bright green flat leaves are smooth and stiff.

* * *Stigmas* 3; *fruit smooth; fertile spikelets short, sessile, or nearly so.*

35. **Pale Sedge** (*C. palléscens*).—Fertile spikelets 2—3, oblong, the lowest stalked, slightly pendulous; bracts leafy, slightly sheathing at the base; fruit obovate, obtuse, tipped by the base of the withered style. A slender species, a foot or more high, well marked by its pale hue and blunt fruit. Common in marshy woods, and flowering in June.

36. **Long Bracteated Sedge** (*C. exténsa*).—Fertile spikelets roundish, oblong; glumes terminating in a sharp point; bracts very long, leafy; fruit beaked; leaves very narrow. Marshes near the sea, rare; flowering in June.

* * * *Stigmas* 3; *fruit smooth; fertile spikelets stalked, erect.*

37. **Yellow Sedge** (*C. flava*).—Bracts very long, leaf-like, sheathing the stalks of the fertile spikelets, and giving them the appearance of being sessile; fertile spikelets distant; fruit swollen, spreading, with a long

1. RUSSET CAREX. *Carex saxatilis.*
2. PALE C. *C. pallescens.*
3. LONG BRACTEATED C. *C. extensa.*
4. YELLOW C. *C. flava.*
5. TAWNY C. *C. fulva.*
6. LOOSE C. *C. distans.*
7. GREEN RIBBED C. *C. binervis.*
8. SMOOTH STALKED BEAKED C. *C. laevigata.*
9. PINE LEAVED C. *C. paniculata.*
10. STOUT BROWN SPIKED C. *C. vaginata.*
11. STARVED WOOD C. *C. depauperata.*

Pl. 252.

recurved beak. Common in turfy bogs and marshes. A slender leafy species of a pale yellowish-green hue, growing about a foot high, and flowering in May and June.

38. **Loose Sedge** (*C. distans*).—Fertile spikelets 2—3, distant, oblong; bracts leafy, shining, not overtopping the barren spike; glumes terminating in a sudden sharp point; fruit equally ribbed on both sides, triangular, black-dotted, beaked. Brackish marshes, flowering in June.

39. **Tawny Sedge** (*C. fulva*).—Fertile spikelets 1—3, oblong, ovate; bracts leafy, sheathing, not overtopping the barren spikelets; glumes acute; fruit erect, with a straight rough-edged beak; stem rough. A slender plant about a foot high, not infrequent in boggy places in sub-alpine districts, marked by its leafy stem, by the long sheath which accompanies the lower bract, and by its short spikelets. It flowers in June. Probably a sub-species of *C. distans*.

40. **Green-ribbed Smooth-stalked Beaked Sedge** (*C. binervis*).—Very like *C. distans*, except that the fruit has two principal green ribs on the outside. It is exceedingly difficult to discriminate between these two plants; if indeed they are not forms of the same. *C. distans* varies in height from six inches to a foot, and grows in marshy places, mostly near the sea. *C. binervis* is abundant on dry moors and mountainous woods, attaining a height of from 2—3 feet, and is remarkable for its slender stems, which frequently droop on all sides from the weight of the spikelets; the glumes of the fertile spikelets are of a dark purple hue, with a green midrib; the leaves are from 6—8 inches long, channelled, rigid, and rough edged. It flowers about June. The Carex described by Hooker and Boswell-Syme under the name of *C. frigida* is now thought to be more correctly regarded as a variety (var. *sadleri*) of the present species. It was discovered by John Sadler, in 1874, in Aberdeenshire.

41. **Smooth-stalked Beaked Sedge** (*C. lævigata*).—Fertile spikelets 3 or 4, distant, on long stalks, the lower one frequently drooping; fruit distinctly furrowed, tapering to a long smooth-edged beak; bracts leaf-like, sheathing. Moist woods, not common. Approaching *C. distans* in habit, but well distinguished by the above characters as well as by its much longer and broader leaves. In Bickleigh Vale, Devon, the two species grow near each other, and retain their distinctive characters very decidedly. It flowers in June.

42. **Salt Marsh Sedge** (*C. punctata*).—Similar to *C. distans*, but easily distinguished by comparing the fruit, which in *punctata* is scarcely triangular, ribbed only at the scarcely discernible angles, is swollen and glossy, and ends in a more slender, smooth and divided beak. This Sedge grows in marshes by the sea, from Cornwall to Hampshire, in Suffolk, Wales, Kirkcudbrightshire, the south of Ireland, and in Guernsey. It flowers in June.

43. **Pink-leaved Sedge** (*C. panicea*).—Fertile spikelets 2 or 3, loose; glumes bluntish, with a green midrib; bracts leafy, sheathing, the lowest about as long as the spike, the rest shorter; fruit somewhat inflated, blunt. A distinct and very pretty plant, from 10—18 inches high, common in marshes and damp meadows, well marked by its foliage, resembling in hue that of the garden pink, its loose spikelets with purple glumes and green

fruit, and the numerous yellow anthers of its barren spikelet. The stems are smooth and obtusely triangular. It flowers in June.

44. **Short Brown-spiked Sedge** (*C. vaginata*).—Resembling the last, except that the fruit is beaked, the broader leaves chiefly from the rootstock and never glaucous. On the Highland mountains, rare; flowering in July.

45. **Starved Wood Sedge** (*C. depauperata*).—Fertile spikelets 3 or 4, each containing about the same number of flowers; bracts leaf-like, very long; fruit large and terminating in a long beak. Dry woods, very rare. Godalming, Surrey; Charlton Wood, Kent; Somerset, and near Forfar, where it flowers in May and June. A strongly marked species, with pale foliage and erect habit, the leaf-like bracts sometimes overtopping the slender terminal spikelet.

* * * * *Stigmas* 3; *fruit smooth; fertile spikelets stalked, drooping, short.*

46. **Dwarf Capillary Sedge** (*C. capillaris*).—Spikelets in long stalks, several sheathed by a common bract. A plant of humble growth from 2—8 inches high, bearing 3 or 4 few-flowered, slender spikelets, of which one is barren, in a kind of umbel. Mountains from Yorkshire northwards; flowering in June and July.

47. **Loose-flowered Alpine Sedge** (*C. rariflora*).—Fertile spikelets 2, slender, loose, few-flowered; bracts very short and narrow; fruit oblong, enfolded in the large blunt glumes. Bogs in the Scottish Highlands, rare, attaining the height of 8—10 inches, and flowering in June.

48. **Mud Sedge** (*C. limosa*).—Fertile spikelets 2, ovate, compact; bracts narrow, as long as the stalks of the fertile spikelets. Marshes, local, Scotland, and southwards to Dorset and Hampshire; Ireland. Remarkable for its large glumes and long narrow leaves, which nearly equal them in height, 10—12 inches. It flowers in June.

49. **Scorched Alpine Sedge** (*C. ustulata*).—Resembling the last in some of the characters, but growing only a span high, and bearing broad short leaves. Reported by G. Don to have been found on Ben Lawers, but never verified.

* * * * * *Stigmas* 3; *fruit smooth; fertile spikelets stalked, drooping, long.*

50. **Loose Pendulous Sedge** (*C. strigosa*).—Bracts leafy, with long sheaths; fertile spikelets slender, loose, slightly drooping; fruit oblong, tapering; leaves broad, pale. Woods, rare, ranging from Chester and Yorks to Kent and Somerset; also in Ireland.

51. **Pendulous Wood Sedge** (*C. sylvatica*) —Bracts leafy, with sheaths not half so long as the stalks; fertile spikelets slender, loose, pendulous; fruit ovate, tapering in a long, cloven, smooth beak. Woods, common; flowering in May and June. A tufted plant with slender stems, from 1—1½ feet high, bright green foliage, and loose spikelets, about half the length of the preceding, which are pendulous, on long, very slender stalks. "Linnæus tells us that this plant, when cured and dressed, is employed by the Lapplanders to protect their feet from the cold."—*Sir W. J. Hooker.*

52. **Great Pendulous Sedge** (*C. pendula*).—Bracts leafy, with long sheaths nearly equalling the stalks; fertile spikelets distant, very long,

1. DWARF CAPILLARY CAREX.
Carex capillaris.
2. LOOSE FLOWERED ALPINE C.
C. pauciflora.
3. MUD C.
C. limosa.
4. SCHORCHED ALPINE C.
C. ustulata.
5. LOOSE PENDULOUS C.
C. strigosa.
6. PENDULOUS WOOD C.
C. sylvatica.
7. GREAT PENDULOUS C.
C. pendula.
8. CYPERUS LIKE C.
C. pseudocyperus.
9. GLAUCOUS HEATH C.
C. glauca.
10. VERNAL C.
C. praecox.

cylindrical. Damp woods and banks of canals, extending as far north as Elgin and Lanark. A tall plant 3—5 feet high, with a stem rough at the angles above, well distinguished by its very long pendulous spikelets, which often exceed 3 or 4 inches. It flowers in May and June.

53. **False Cyperus** (*C. pseudocypérus*).—Bracts leaf-like, much overtopping the stem; fertile spikelets cylindrical, on long stalks, somewhat crowded towards the top of the stem; glumes bristly; fruit terminating in a very long, spreading, deeply 2-cleft beak. Damp woods, rare. A very handsome and perfectly distinct species, from 2—3 feet high, with rough stems and leaves, and 5 or 6 fertile spikelets about 2 inches long, the fruit of which is so rigid as to be almost prickly. The terminal barren spike is occasionally fertile above. It flowers in June.

54. **Glaucous Heath Sedge** (*C. glaúca*).—Bracts leafy, scarcely sheathing; fertile spikelets 2 or 3, cylindrical, slightly drooping when in flower; stalks long, slender, and finally recurved; fruit broadly obovate, blunt, slightly downy at the point. Distinguished by its glaucous leaves (which somewhat resemble those of *C. panícea*), smooth triangular stem, densely flowered spikelets, and blunt fruit. There are often two barren spikelets. It grows, about a foot high, in damp meadows, and flowers in June; common.

* * * * * * *Stigmas* 3; *fruit downy; fertile spikelets without stalks.*

55. **Vernal Sedge** (*C. præcox*).—Fertile spikelets 1—3, crowded, sessile; lower bract leafy, with very short sheaths; glumes broadly ovate, pointed; fruit ovate, obscurely triangular, acute. A humble plant from 3—8 inches high, common in dry pastures, where it makes itself conspicuous among the grass in early spring by its rather broad foliage and numerous yellow anthers.

56. **Mountain Sedge** (*C. collína*).—Fertile spikelets 1—3, crowded, ovate, sessile; bracts short and narrow, with short membranaceous sheaths; fruit oblong, very downy. Rare, or local in Monmouthshire, Gloucestershire, Herefordshire, Worcestershire, Devon, Hants, and Sussex. It flowers in April and May, and grows from 4—7 inches high. Also known as *C. montana.*

57. **Heath Sedge** (*C. ericetórum*).—Spikelets small, few, capitate; fertile 6 to 10-flowered, barren solitary; glumes pale brown, with broad scarious margins; bracts glume-like, and scarcely sheathing. This is a small species that grows on banks in chalk districts. Its creeping rootstock branches into tufts of 3-sided, stiff, smooth stems, which are from 2—6 inches high. The leaves are keeled, and have their margins rolled back. The fruit is downy, egg-shaped, with an entire beak, and the nut is pale and stalkless. It flowers in May and June, and is found in Cambridge, Norfolk, and Suffolk. Also known as *C. ciliata.*

58. **Round Headed Sedge** (*C. pilulífera*).—Fertile spikelets, 2—4, crowded, roundish, sessile; bracts short and narrow, without sheaths; leaves short and broad; glumes rigid and pointed; fruit nearly globose, acute. A common species with a very slender rough stem, bearing near the summit several short spikelets of few flowers; growing in wet moors, where it attains a height of 6—18 inches; flowering in June.

* * * * * * * *Stigmas* 3; *fruit downy; fertile spikelets stalked.*

59. **Dwarf Silvery Sedge** (*C. clandestína*).—Fertile spikelets 1—3, each of about 3 flowers, which are concealed by the large membranaceous bracts. A humble plant from 2—3 inches high, with a stout creeping root-stock; the leaves are narrow and much longer than the stalks. It grows on Salisbury Plain and on dry grassy hills in a few other localities in neighbouring counties, but is rare. It flowers in May. Also known as *C. humilis.*

60. **Fingered Sedge** (*C. digitáta*).—Fertile spikelets 3—4, rather distant, slender, loosely flowered, the upper one longer than the terminal barren spikelet; bracts membranaceous, awl-shaped, the lower one with a short leafy point. A slender and graceful plant from 8—10 inches high; the spikelets are remarkably lax, but the glumes and fruit are comparatively large. In limestone woods between Yorkshire, Devon, and Wilts, very rare; flowering in May. A sub-species, *C. ornithopoides*, with broader bracts, the fruit longer than the glumes and without beak, is found in Derbyshire and Yorkshire.

61. **Large Downy-fruited Sedge** (*C. tomentósa*).—Fertile spikelets about 2, nearly sessile, short, obtuse, with acute glumes; fruit globose, densely downy, with a short notched beak. Wet meadows near Merston Measy, Wiltshire; flowering in June. "A well-marked and very rare species, no other station being known for it in Britain than that just mentioned, whence I have an original specimen."—*Sir W. J. Hooker.*

vi. *Terminal spikelets barren, 2 or more; the rest fertile. Stigmas* 3.

* *Fruit downy.*

62. **Slender-leaved Sedge** (*C. filifórmis*).—Fertile spikelets 3 or 4, nearly sessile; bracts leafy, very narrow, much longer than their spikelets; glumes sharp-pointed, chestnut brown with green midrib. Boggy marshes, rare; flowering in May. A slender plant from 2—3 feet high, with long, very narrow, channelled, stiff, sheathing leaves; the sheaths reddish-brown.

63. **Hairy Sedge** (*C. hírta*).—Whole plant downy; fertile spikelets 2 or 3, remote, erect; bracts very long, leaf-like, with long sheaths. Marshy and damp woods, frequent. Much stouter than the last, and easily distinguished by its broad hairy leaves, and spikelets of large downy fruit. It flowers in May and June.

* * *Fruit smooth.*

64. **Slender-beaked Bottle Sedge** (*C. ampullácea*).—Fertile spikelets 2 or 3, remote, erect, shortly stalked; bracts leaf-like, long, without sheaths; fruit inflated, beaked; stem smooth, with three rounded angles. Bogs and marshes, mostly in the north. Stem and leaves from 1—2 feet high. The leaves are channelled, glaucous, and round at the edges. It flowers in June. Also known as *C. rostrata.*

65. **Short-spiked Bladder Sedge** (*C. vesicária*).—Fertile spikelets 2 or 3, slightly drooping, nearly sessile; bracts long and leafy, without sheaths; fruit much inflated, beaked; stem rough, with 3 acute angles. Resembling the last, from which it is distinguished by the above characters,

1. MOUNTAIN CAREX
Carex collina
2. ROUND HEADED C
C pilulifera
3. DWARF SILVERY C
C clandestina
4. FINGERED C
C digitata
5. LARGER DAWNY FRUITED C
C tomentosa
6. SLENDER LEAVED C
C filiformis
7. HAIRY C
C hirta
8. SLENDER BEAKED BOTTLE C
C ampullacea
9. SHORT BEAKED BLADDER C
C vesicaria
10. LESSER COMMON C
C paludosa
11. GREAT COMMON C
C riparia

Pl. 254.

as well as by its broader green foliage, and much larger inflated fruit. Bogs and marshes, not common; flowering in June.

66. **Lesser Common Sedge** (*C. paludósa*).—Fertile spikelets cylindrical, slender, obtuse; glumes of the barren spike obtuse; bracts long and leafy, without sheaths; fruit oblong, tapering to a point. A tall plant from 2—3 feet high, with broad keeled leaves, which, as well as the stem, are rough. Common on the banks of rivers and canals; flowering in May.

67. **Great Common Sedge** (*C. ripária*).—Fertile spikelets somewhat crowded, broadly cylindrical, tapering to a point which is often barren; glumes of the barren spikelet tapering to a long point; bracts long and broad, without sheaths; fruit oblong, tapering to a point. Taller (3—5 feet) and stouter than the last, with much broader leaves, which, as well as the stem, are rough. The stem is leafy, and the large dark brown spikelets are crowded towards the summit of the stem. Common on the banks of rivers and canals; flowering in May.

Order CI. GRAMINEÆ—GRASSES

The flowers of Grasses are combined to form *spikelets*, which in turn are variously associated to form spikes, racemes, or panicles. A single spikelet usually includes two empty or flowerless glumes. Above or within these rises a delicate stalk known as the *rachilla*, bearing one or more boat-shaped glumes which normally contain flowers, and are therefore always referred to as the *flowering glumes*, although sometimes they are empty. The flowers may contain both stamens and pistils, or only one kind of these organs, and are known as perfect or imperfect flowers accordingly. Within the flowering glume will be found a flat scale (the *palea*) with incurved edges, and often marked with two nerves. Opposite the palea are two more minute scales (*lodicules*). These are absent in some species, whilst in others they are increased in number; with the palea they appear to represent the perianth of other orders of plants. There are usually 3 stamens, though the number is reduced or increased in various genera; the filament hair-like, and the 2-celled anther so poised on its tip (*versatile*) that it is readily moved by slight air-waves. The ovary is always 1-celled, with a variable style, but the 2 stigmas are always feather-like to catch the wind-borne pollen. There is only 1 ovule or seed-egg, and as this develops into the seed it is usually attached to the ovary, and this often adheres to the palea, sometimes to the flowering glume also.

When the spikelets are seated along a common stalk (*rachis*) without any foot-stalks (*pedicels*), the inflorescence is termed a spike, as in the Upright Sea Lyme-grass. When the spikelets all turn one way, it is a one-sided spike, as in the Mat-grass. When the spikelets are arranged on branches, it is a panicle; and this may either be spreading, as in the Quaking-grass, or it may be so close as to be spike-like, and is then a spiked panicle, as in the Vernal-grass; or the spikelets may be on undivided stalks, when it is racemed, as in Heath-grass. The stem of the Grasses is often called a culm; it is cylindrical, or nearly so (never triangular), hollow, and jointed, the joints

becoming more distant at the upper part, with a leaf at each joint, having a split sheath, and at the summit of the sheath often a membrane called a ligule. The rachis is that part of a stem which runs through the spike or panicle, and bears the flowers. The roots of Grasses are fibrous, the fibres often proceeding from underground stems; and in some cases Grasses are viviparous, forming buds between the leaf and stem.

In the following pages the genera are arranged in the order adopted by Miss Pratt, any alteration of which would greatly interfere with ready reference to the figures on the plates; but with a view to showing the natural affinities of these genera, as understood by botanists to-day, we give a synopsis of them based on Bentham's 'Notes on Gramineæ' in the *Journal of the Linnean Society*, Vol. XIX. This synopsis takes the place of Miss Pratt's diagnoses of the genera in former editions. The number following the generic description in this synopsis refers to the position of the genus in Miss Pratt's arrangement, where will be found a bracketed number referring back to the revised synopsis.

SERIES A.—PANICACEÆ.

Spikelets attached to the pedicel by a joint beneath the first glume. Rachilla not jointed, and not extended beyond the uppermost glume. Glumes not more than 4, of which only the terminal one is furnished with both stamens and pistil; the one next below it may be staminal or empty, and those below that empty.

Tribe I. PANICEÆ.—Fruiting glume hardening round the fruit, with 3 or more nerves.

1. **Panick-grass** (*Pánicum*).—Pedicels naked or hairy; glumes 4 (empty glumes 2 or 3); flowering glume nerved, hardening round the palea and fruit; scales 2, fleshy; stamens 3; stigmas brush-like. Name, the old Latin name from *panis*, bread. 24, 44.

2. **Bristle-grass** (*Setária*).—Pedicels furnished with stiff bristles; spikelets in a dense spike-like panicle; glumes 4. Name from the Latin *seta*, a bristle. 25.

3. **Cord-grass** (*Spartína*).—Glumes 3; empty glumes awned or pointed. Name from the Greek *spartine*, a cord, the leaves having been used in making cordage. 42.

Tribe II. ORYZEÆ.—Glumes 2 or 4 (rarely 3).

4. **Cut-grass** (*Leérsia*).—Spikelets panicled, compressed, 1-flowered; empty glumes absent; flowering glume 3-nerved; stamens usually 3; hardened glume enclosing the palea and compressed fruit. Named after John D. Leers, a German botanist. 3.

5. **Fox-tail** (*Alopecúrus*).—Inflorescence spike-like; spikelets compressed, 1-flowered; glumes 3 or 4; flowering glume glassy, twisted, 3-nerved; scales and palea absent; stamens 3; fruit compressed, enclosed in the glume. Name from the Greek *alopex*, a fox, and *oura*, a tail. 4.

Tribe III. TRISTEGINEÆ.—Glumes 3 (in the British species), thin, often hyaline; the flowering glume frequently with a slender bent awn.

1. SWEET SCENTED VERNAL GRASS.
   Anthoxanthum odoratum.
2. MAT G.
   Nardus stricta.
3. MEADOW FOX TAIL G.
   Alopecurus pratensis.
4. ALPINE F.T.G.
   A. alpinus.
5. SLENDER F.T.G.
   A. agrestis.
6. TUBEROUS F.T.G.
   A. bulbosus.
7. FLOATING F.T.G.
   A. geniculatus.
8. ORANGE SPIKED F.T.G.
   A. fulvus.

6. **Beard-grass** (*Polypógon*).—Panicle contracted, dense, and spike-like; empty glumes with long awns. Name from the Greek *polus*, many, and *pogon*, a beard, in allusion to the numerous awns. 12.

SERIES B.—POACEÆ.

Pedicel of spikelet not jointed below lower empty glumes, which remain on panicle after fruiting glume has fallen away, or fall away independently; glumes 3 or more; imperfect flowers above the fertile one.

Tribe IV. PHALARIDEÆ.—Spikelet of 6 glumes; the lowest pair (below the joint) empty; the next pair (above joint) usually empty and small, sometimes reduced to a small bristle; upper pair enclosing fertile flower, without any continuation of rachilla above it.

7. **Canary-grass** (*Phálaris*).—Spikelets laterally compressed, in spreading or spike-like panicles; lowest pair of empty glumes the largest, usually flat and often winged on the keel; second pair very narrow, often reduced to bristles. Name from the Greek *phalos*, shining. 5.

8. **Vernal-grass** (*Anthoxánthum*).—Panicle spike-like; one of the lowest pair of glumes larger than the others of the spikelet; second pair small, empty, awned. Name from the Greek *anthos*, a flower, and *xanthos*, yellow. 1.

9. **Holy-grass** (*Hierochlóe*).—Panicle loose; second pair of glumes almost as large as the lower ones, and frequently enclosing each a staminate flower. Name from the Greek *ieros*, holy, and *chloa*, grass, it being formerly strewed on the floors of churches. 21.

Tribe V. AGROSTEÆ.—Spikelet of 3 glumes, lower pair empty, persistent, below the joint of the rachilla; upper glume containing a fertile flower, with or without a bristle-like termination of the rachilla beyond it.

10. **Feather-grass** (*Stipa*).—Panicle erect; rachilla of spikelet not continued beyond flowering glume; awn of flowering glume terminal, very long and twisted. Name from the Greek *stupe*, tow of flax. 11.

11. **Millet-grass** (*Milium*).—Panicle spreading; rachilla not continued beyond flowering glume, which hardens round the fruit, and is not awned. Name, the Latin for millet. 9.

12. **Cat's-tail-grass** (*Phléum*).—Panicle dense, cylindric; flowering glume enclosing fruit. Name from the Greek *phleos*, given to this or some other grass. 7.

13. **Knapp's-grass** (*Mibóra* or *Knáppia*).—Spikelets compressed in a simple two-ranked spike; lower empty glume at least as long as the flowering one. Etymology of *Mibora* unknown; *Knáppia* after Mr. J. L. Knapp, author of a work on British Grasses. 41.

14. **Bent-grass** (*Agróstis*).—Panicle loose; spikelets very small; empty glumes 2, unequal, keeled, awnless; flowering glume smaller, glassy, with or without a slender dorsal awn. Name from the Greek *agros*, a field. 14.

15. **Small Reed** (*Calamogróstis*).—Panicle close or spreading, somewhat one-sided; spikelets 1-flowered; flowering glume bearing a fine dorsal awn, and surrounded by a ring of long hairs. Name from the Greek *kalamos*, a reed, and *agrostis*, grass. 13.

16. **Nit-grass** (*Gastrídium*).—Spikelets similar to those of *Agrostis*, but in a closer, more slender panicle; outer glumes swollen at the base, shining, and somewhat hardened; flowering glume minute, glassy, toothed. Name from the Greek *gastridion*, a ventricle. 10.

17. **Silky Bent-grass** (*Apera*).—Annual grasses, with small, shining, 1-flowered spikelets, panicled; rachilla produced beyond the flowering glume; empty glumes 2, unequal, keeled; flowering glume shorter, with a slender, wavy, dorsal awn. Name from the Greek *aperos*, undivided, having reference to the flowering glume. 14 (*Agrostis*).

18. **Deyeux's Small-reed** (*Deyeúxia*).—Similar to *Calamogrostis*, but having the rachilla prolonged into a bristle that is usually hairy. Named after N. Deyeux, a French chemist. 13 (*Calamogrostis*).

19. **Sea-reed, or Marram-grass** (*Ammóphila*).—Panicle contracted, dense; spikelets large, laterally compressed, 1-flowered; empty glumes 2, nearly equal, scarcely larger than the rigid flowering glume, which is 5-nerved, and has a tuft of silky hairs at its base; awn minute, near the tip of glume. Name from the Greek *ammos*, sand, and *philo*, lover, in allusion to its habitat. 6.

20. **Hare's-tail-grass** (*Lagúrus*).—Spikelets in a dense egg-shaped head; empty glumes 2, equal, larger than the flowering glume, ending in long feathery points, which give a soft furry aspect to the head; flowering glume shortly stalked, with a long bent and twisted awn and two shorter ones. Name from the Greek *lagos*, a hare, and *oura*, a tail. 8.

Tribe VI. AVENEÆ.—Spikelets panicled, flowers 2 or more, the rachilla produced beyond the upper flower; flowering glume with 2 lobes or teeth, between which or on the back is a twisted awn. In *Aira*, however, the rachilla is not produced.

21. **Hair-grass** (*Aira*).—Spikelets laterally compressed, in a loose panicle, small, 2-flowered, the rachilla not produced; flowering glumes with dorsal awn. Name Greek (from *airo*, to destroy), applied to some species of grass. 16.

22. **Club-grass** (*Corynéphorus*).—Spikelets panicled, small, 2-flowered; rachilla produced; empty glumes 2; flowering glume glassy, awn dorsal, bent, twisted below the joint, which is bearded, tip thickened, club-like. Name from the Greek *koryne*, a club, and *phero*, to bear. 16 (*Aira*).

23. **Tussock-grass** (*Deschámpsia*).—Spikelets panicled, 2-flowered; rachilla produced, sometimes bearing an imperfect flower; empty glumes keeled, shiny, toothed, 3—5-nerved; awn dorsal. Named in honour of M. Deschamps, a French chemist. 16 (*Aira*).

24. **Soft-grass** (*Hólcus*).—Similar to *Deschampsia*, but with the upper flower of each spikelet imperfect (staminate) and awned, whilst the lower is perfect and unawned. Name Greek, but of uncertain meaning. 19.

25. **Three-awned-grass** (*Trisétum*).—Spikelets compressed, borne in an open panicle, 2—6-flowered; rachilla produced, sometimes with an imperfect flower; empty glumes unequal, keeled; flowering glumes shorter, ending in a 2-awned point, and with a long, twisted, dorsal awn. Name from the Latin *tri*, three, and *seta*, bristles. 33 (*Avena*).

1 CULTIVATED CANARY GRASS
Phalaris canariensis
2 REED C G
P. arundinacea
3 COMMON SEA REED
Ammophila arundinacea
4 COMMON CATS-TAIL GRASS
Phleum pratense
5 ALPINE C-T G
P. alpinum
6 ROUGH C-T G
P. asperum
7 PURPLE-STALKED C-T G
P. hœhmeri
8 MICHELIAN C-T G
P. michelii
9 SEA C-T G
P. arenarium

Pl. 256

26. **Oat-grass** (*Avéna*).—Spikelets panicled, large, rounded, 2 or more flowered, the upper flower usually imperfect; empty glumes 2; flowering glume as large as the empty ones, with a cleft tip, from which arises a long bent and twisted awn. Name the old Latin for the oat. 33.

27. **Oat-like-grass** (*Arrhenátherum*).—Similar to *Avena*, but differing in having the upper flower perfect and the lower imperfect. Name from the Greek *arrhen*, male, and *ather*, awn. 20.

Tribe VII. CHLORIDEÆ.—Spikelets sessile, in 2 rows in one-sided spikes; lowest flower of spikelet perfect; awns when present straight and terminal.

28. **Dog's-tooth-grass** (*Cýnodon*).—Spikelets small in slender spikes, which are arranged in a digitate manner at the end of the panicle, the rachilla produced beyond it in a small point or bristle. Name from the Greek *kuon*, a dog, and *odous*, a tooth. 43.

Tribe VIII. FESTUCEÆ.—Spikelets panicled or subspicate; rachilla usually produced beyond the flowering glume, often bearing a rudimentary glume; glumes 6 or more, the 2 lowest empty; awn if present terminal.

29. **Heath-grass** (*Triódia*).—Spikelets rounded in panicle, 3—5-flowered, upper flower often imperfect; rachilla jointed between the flowers; flowering glumes 3-toothed, keeled. Name from the Greek *treis*, three, and *odous*, a tooth. 27.

30. **Reed** (*Phragmítes*).—Spikelets panicled, half-round, 3—6-flowered, of which the two lowest contain stamens only, the others perfect; empty glumes 2, short, keeled, unequal; flowering glumes clothed in long silky basal hairs, except the lowest, which is naked. Name from *phragmites*, materials for an enclosure. 34.

31. **Moor-grass** (*Sesléria*).—Spikelets crowded in a dense egg-shaped head, with bracts sheathing the lower footstalks; spikelets compressed 2—6-flowered; rachilla jointed above the lower glumes; empty glumes 2; flowering glumes 2 or 3, smaller, the upper rudimentary. Name from L. Sesler, an Italian botanist. 23.

32. **Dog's-tail-grass** (*Cynosúrus*).—Spikelets of two forms in a dense spike-like panicle; upper spikelet rounded, 2—5-flowered, with an upper empty glume; lower spikelets reduced to an involucre of awl-shaped and rigid empty glumes, which are arranged in two rows up the rachilla; empty glumes 2; flowering glumes leathery, opaque, rounded, 3-keeled. Name from the Greek *kuon*, a dog, and *oura*, a tail. 30.

33. **Koeler's grass** (*Koelária*).—Panicle spike-like; spikelets oblong, compressed, 2—5-flowered; rachilla jointed between the flowering glumes and terminated by 2 or 3 empty glumes; flowering glumes one-sided, rather longer than the empty ones, slightly keeled. Named in honour of G. L. Koeler, a German writer on grasses. 22.

34. **Molina's grass** (*Molínia*).—Panicle contracted; spikelets somewhat rounded, 1—5-flowered, the uppermost imperfect; empty glumes 2; flowering glumes longer, conical, awnless, strongly 3-nerved. Named in honour of G. J. Molina, a Spanish botanist. 17.

35. **Whorl-grass** (*Catabrósa*).—Panicle branched, spreading; spikelets

minute, roundish, 1, 3, or 4-flowered; rachilla jointed between the flowering glumes; empty glumes 2, unequal, awnless; flowering glumes longer, leathery, wedge-shaped, awnless, torn at the tip. Name from the Greek *katabrosis*, from the gnawed appearance of the tip of the glumes. 15.

36. **Melic-grass** (*Mélica*).—Spikelets racemed or panicled, rounded, 1 or 2-flowered; rachilla much lengthened, and bearing a club-like head of flowering glumes; empty glumes 2, nearly equal, awnless. Name from the Latin *mel*, honey. 18.

37. **Cock's-foot-grass** (*Dáctylis*).—Panicle 1-sided, the spikelets densely overlapping at the ends of its branches; spikelets laterally compressed, 1-sided, 3—4-flowered; empty glumes 2, keeled, and with points at their tips; flowering glumes larger, with a rough short awn. Name from the Greek *daktulis*, a finger. 29.

38. **Quake-grass** (*Bríza*).—Panicle much branched and loose; spikelets egg-shaped or heart-shaped, laterally compressed; rachilla jointed between the flowering glumes; empty glumes 2, rounded at back; flowering glumes boat-shaped, overlapping, upper often flowerless. Name, the old Greek for this grass, from *brithō*, to tremble. 28.

39. **Meadow-grass** (*Póa*).—Panicles branched, usually loose; spikelets compressed, 2 or many flowered; rachilla jointed between the flowering glumes; empty glumes 2, shorter than the lowest flowering glume, unequal, keeled; flowering glumes often webbed below, keeled, 5—7-nerved, with glassy tips. Name the Greek *poa*, fodder. 26.

40. **Manna-grass** (*Glycéria*).—Panicles branched, loose or contracted; spikelets narrow, rounded, many flowered; rachilla jointed between the flowering glumes; empty glumes 2, shorter than the lowest flowering glume, unequal, awnless; flowering glumes convex, not keeled, tip blunt, nerves 3—9. Name from the Greek *glukeros*, sweet, in allusion to the flavour of the grain. 26 (*Poa*).

41. **Fescue-grass** (*Festúca*).—Spikelets in racemes or panicles, rounded, 3 or more flowered; rachilla jointed between the flowering glumes; empty glumes 2, unequal; flowering glumes 3—5-nerved, with a point or awn at or near the tip, upper one sometimes empty. Name an old Latin one. 31.

42. **Brome-grass** (*Brómus*).—Spikelets panicled or racemed, rounded or laterally compressed, 5 or many flowered; rachilla jointed between the flowering glumes; empty glumes 2, unequal, shorter than lowest flowering glumes, leathery, awnless; flowering glumes, convex or keeled, 5—9-nerved, 1—3-awned. Name from *bromos*, the Greek name for a kind of oat. 32.

43. **False Brome-grass** (*Brachypódium*).—Spikelets arranged in two rows on the rachis, many-flowered; rachilla jointed between the flowering glumes; empty glumes 2, or rarely 1; flowering glumes closely overlapping, 7—9-nerved, awn, if present, terminal. Name from the Greek, *brachus*, short, and *podion*, foot, in allusion to the almost sessile spikelets. 38.

Tribe IX. HORDEEÆ.—Spikelets seated in the notches of an unbranched rachis, either singly or 2 or 3 from one notch; one or several flowered.

44. **Darnel** (*Lólium*).—Spikelets flattened, many-flowered, solitary in notches, inserted with their edge to the rachis; empty glume 1, except in

1. OVATE HARES TAIL GRASS
Lagurus ovatus.
2. SPREADING MILLET G.
Milium effusum.
3. AWNED NIT G.
Gastridium lendigarum.
4. COMMON FEATHER G.
Stipa pennata.
5. ANNUAL BEARD G.
Polypogon monspeliensis.
6. PERENNIAL B. G.
P. littoralis.

the terminal spikelet, which has 2; flowering glumes rigid, 5—7-nerved. Name, an old Latin one for these grasses. 39.

45. **Wheat-grass** (*Agropýrum*).—Spikelets similar to those of *Lolium*, and arranged in the same way, but with their flat sides to the rachis; empty glumes 2, unequal; other characters as in *Lolium*. Name, the classical one for these or similar grasses, from the Greek *agros*, a field, and *puros*, wheat. 37 (*Triticum*).

46. **Hard-grass** (*Leptúrus*).—Spikelets solitary, arranged alternately in two rows, with their broadsides to the jointed rachis, 1-flowered; rachilla produced, sometimes terminated by a second flowering glume; empty glumes 2, leathery, ribbed, equal; flowering glume keeled, inclosed in the empty glumes. Name from the Greek *leptos*, slender, and *oura*, tail. 40.

47. **Mat-grass** (*Nárdus*).—Spikelets sessile and solitary in the notches of a one-sided unbranched spike, arranged obliquely, 1-flowered; empty glumes absent; flowering glume 1, slender, keeled, shortly awned. Name, the Greek *nardos*, originally applied to some aromatic plant. 2.

48. **Barley** (*Hórdeum*).—Spikelets almost sessile, in a two-rowed spike, 2 or 3 from the same notch, and arranged broadside to the rachis, 1-flowered; rachilla produced, with an awl-shaped rudimentary glume; empty glumes 2, equal, awned; flowering glume rounded at back, awned. Name, the old Latin name for these plants. 36.

49. **Lyme-grass** (*Élymus*).—Spikelets and their arrangement similar to *Hordeum*, but from 2—7-flowered; flowering glumes leathery, 5-nerved. Name from the Greek *eluo*, rolled up. 35.

1. (8) Vernal-grass (*Anthoxánthum*).

Sweet-scented Vernal-grass (*A. odorátum*).—Panicle spiked, oblong; glumes about as long as the awns. Perennial. This grass may be known by its early flowering. By the middle of April, while as yet scarcely any grasses are in blossom, the compact panicle of this species may be seen on its slender stem, which is about a foot high, and accompanied by short, flat, rather light green leaves. It is rather abundant in meadows, pastures, and on downs, growing often at a great elevation. It is a grass to which our summer hay-field owes much of its fragrance, for though other grasses contribute to this, in some degree, yet hay made from rye-grass, or other sown grasses in which this vernal species is wanting, has not the sweetness yielded so fully by this. Its glumes, as seen beneath the microscope, are copiously furnished with small glands, containing a fragrant essential oil. The scent of this grass is less powerful in its fresh than in its dried state, but its pleasant flavour, reminding us of highly-scented tea, is perceptible to the taste at all stages of its growth. It grows in any soil or situation, becoming more luxuriant on moist land, and bearing, when growing in marshes, a large panicle. Though its amount of herbage is small, yet its readiness of growth renders it a useful pasture-grass; and its sweetness fits it for pleasure-grounds. Professor Buckman remarks, that it is a most valuable grass to mingle with others, from the flavour which it imparts, but that it is too bitter to be greatly relished by cattle in continual use, and without the admixture of other grasses. Its leaves are apt in dry seasons to be blighted, and to assume an

orange tint, and its stems, which do not seem to be eaten by cattle, wither early. The spike is by the middle of June of so bright a yellow as to have suggested the botanic name of the genus.

A species known as *A. puelii* has been introduced from Central Europe in recent years, and has now become pretty widely distributed over the western half of England. It differs from the foregoing in being an annual, with more slender and more tufted stems, a looser panicle, and longer awns. The fragrance is not nearly so strong as in the native species.

2. (47) Mat-grass (*Nárdus*).

Mat Grass (*N. stricta*).—Spike erect, slender; the spikelets rather distant, all pointing one way. Perennial. This is a rigid grass, growing in short tufts, and common everywhere on moors, heaths, and other dry places. It is five or six inches high, and bears in June its one-sided spike of flowers, which is often of a purplish or bronze colour, and armed with minute awns. The stems and leaves are slender, and hard, and too harsh to be much eaten by cattle; the matted tufts which it forms suggested its familiar name.

3. (4) Cut-grass (*Leérsia*).

European Cut-grass (*L. oryzoides*).—Panicle spreading with wavy branches; spikelets half-oval, with numerous delicate hairs at the back. Perennial. This rare grass was discovered years ago by Mr. Borrer, in ditches, brooks, and wet places, in West Sussex and South Hampshire, and it has since been found in Surrey and Dorset. Its stem is one or two feet high, its leaves are broad and very rough at the edges, and it flowers from August to October. Mr. Babington remarks: "The panicle is rarely, if ever, protruded in this country, but is mostly included in the sheath of the uppermost leaf."

4. (5) Fox-tail (*Alopecúrus*).

1. **Meadow Fox-tail** (*A. praténsis*).—Stem erect, smooth; panicle spiked, cylindrical, thick, and blunt; margins of flowering glume united towards the base, and, as well as the empty glumes, much fringed with fine hairs. Perennial. This tall grass, often two feet high, bears in May and June its yellowish-green erect panicle, about two inches long, and covered with silvery hairs. It comes into flower next in succession to the Vernal-grass, and, like it, is very abundant, often constituting the chief part of the herbage of plains and meadows. It becomes most plentiful and luxuriant in marshy lands, where, by its creeping rootstocks, it helps to drain and consolidate the soil. It often grows in salt marshes; and in moist places the base of the stem becomes so enlarged, that if this portion only of the plant were regarded, it might be mistaken for *A. bulbósus*, which, however, has a long slender spike tapering at both ends. It is a most valuable grass for cattle, coming early, furnishing a large quantity of nutritive herbage, and yielding a better aftermath than almost any other grass. Its seeds are easily collected, but Mr. Purton remarks that at least one-third of them are annually destroyed by a minute orange-coloured larva. Professor Buckman, who communicated the result of his experiments on grasses to the *Gardener's Chronicle*, remarks of

1. WOOD SMALL REED
Calamagrostis epigejos
2. PURPLE FLOWERED S.R.
C. lanceolata
3. NARROW S.R.
C. stricta

this, that it might probably be profitably employed as a self-grass, especially in rich low-lands. "In such a situation," says this botanist, "at the foot of Silbury Hill, Wilts, during a visit in the first week of May, 1849, an unusually cold spring, I walked through a field of this grass, which was being folded off by sheep, and a more luxuriant crop or better herbage I never remembered. It also does well where irrigation can be adopted, but it does not succeed well on the uplands. My garden specimens, however, yield an average crop, which endures cutting admirably, and throws up a tolerable second culmiferous and leafy growth."

2. **Alpine Fox-tail** (*A. alpínus*).—Stem erect above, slightly procumbent at the base; panicle spiked, oval; awn short; upper leaf short and broad, and its sheath swollen and very long; rootstock creeping. Perennial. The stem of this grass is nearly a foot high, its leaves are broad and rough at the edges and inner surfaces. The panicle is short and blunt, rarely an inch in length, and very soft and silky, appearing in June and July. It is a mountain grass, growing at an elevation of 2,100 to 3,600 feet by the sides of streams, and on other marshy spots among the mountains of Scotland. Sheep eat its leaves, but it is not a valuable pasture-grass.

3. **Slender Fox-tail** (*A. agréstis*).—Stem erect, the upper part rough; panicle cylindrical, tapering to a point at both ends; empty glumes acute, united below; flowering glume smooth, with an awn more than twice its length. Annual. This grass, though considered as scarcely indigenous to Scotland, is common on road-sides in England, and often proves a troublesome weed to the farmer, by coming up early in spring in wheat, clover, and other fields. John Ray called it Mousetail. It is readily distinguished in June and July by its slender spike, sometimes three inches long. The acute glumes are of a delicate sea-green colour, often tipped with purple. Its slender stem is one or two feet high, the leaves have a tendency to curl, and are frequently of a purplish-green hue. It thrives best on dry soils. Country people call it Black-bent.

4. **Floating Fox-tail** (*A. geniculátus*).—Stem ascending, smooth, bent at the joints; panicle cylindrical, blunt; empty glumes united at the base, blunt; awn inserted at the base of the flowering glume. Perennial. The specific name of this plant points out a ready distinction, for the stem is always kneed, and sometimes the joints are enlarged and fleshy. The stem is about a foot long, branching below, and in July and August is terminated by the sea-green panicle, delicately fringed, and one or two inches in length. The leaves are rather rough on both sides. It is not uncommon in marshy places, and though sometimes found in dry spots, is far more luxuriant in those which combine moisture and shade, where it attains sometimes the height of three feet. Its anthers are of a purplish-yellow colour. It is not a valuable grass to the agriculturist.

5. **Tuberous Fox-tail** (*A. bulbósus*).—Stem erect, smooth; panicle spike-like, slender, taper-pointed, hairy; empty glumes acute, not united; awn twice as long as the flowering glume. Perennial. This is a rare plant, inhabiting wet salt marshes, and apparently a sub-species of *A. geniculatus*. The glumes on all the other British species are united at the base, but these, as may be seen by the aid of a lens, are entirely distinct. The stem of this

Fox-tail is about a foot high, sometimes prostrate below, and the lowermost knots become large, oval, and fleshy tubers, generally of a rich purple colour. The dense panicle is dark green, about an inch long, and appears in July.

6. **Orange-spiked Fox-tail** (*A. fúlvus*).—Stem kneed at the joints; panicle spiked, cylindrical, blunt; empty glumes united at the base, slightly hairy. Perennial. The spike of this Fox-tail, which is two or three inches long, is conspicuous in July by its orange-coloured anthers. The plant grows in ponds and ditches, but is local. Its stem is one or two feet in length, and bending below. This is another sub-species of *A. geniculátus*, but the awn is much shorter, and the spike is more slender and of a lighter colour.

5. (7) CANARY-GRASS (*Phálaris*).

1. **Canary-grass** (*P. canariénsis*).—Panicle large, spiked, erect, oval; empty glumes winged on the keel. Annual. Stray specimens of this handsome grass, naturalized on spots near to fields in which it has been cultivated, may often be gathered both in England and Scotland. We find it among our corn in July, or on some field border, its conspicuous panicle growing on a sea-green stem, one or two feet high, and its leaves lance-shaped, rather long, broad, and soft. It has been cultivated in this country that its seeds may supply food for caged birds, since the time of Queen Elizabeth, and is believed to have been introduced by the emigrants from the Netherlands. Large fields of it may yet be seen in some places. The panicle is of a pale straw-colour, the chaffy glumes edged and marked with green, and remarkably keeled at the back.

2. **Reed Canary-grass** (*P. arundinácea*).—Panicle erect, with spreading branches; the spikelets numerous and crowded in a mass; empty glumes not winged; rootstock creeping. Perennial. This grass is, in its general appearance, altogether unlike the last, but is similar in the structure of its florets. Its stem is sometimes five feet high, and its flowers are, in June and July, very conspicuous by river sides, where it is not infrequent, and where its pale green or purplish panicle nods to the wind. In its early growth this is close, spreading only when nearly of its full length, which is about six inches. The large rootstocks creep into the soft soil, rendering it firmer, and its broad long flat leaves are slightly rough on both sides. There is a variety of this plant, *variegata*, in which the leaves are striped with pale yellow or white, known in gardens as Painted Grass, Ribbon Grass, or Gardener's Garters, and prized more for its foliage than for its flowers. Parkinson, who wrote his "Garden of Flowers" in the time of Charles II., concluded his work by a description of grasses, and tells his readers that he has led them through his gardens of pleasure, and showed them all the variety nursed therein, and adds: "I shall now, lastly, according to the use of our old ancient Fathers, bring you to rest on the grasse, which yet shall not be without some delight, and that not the least of all the rest." He says of the other grasses, "that they are known only to a few;" and very short is his own list of their number. This old writer, however, remarks of the Painted Grass, "The French call it *Aiguillettes d'Armes*, of the fashion that their ensignes, pennons or streamers used in wars were of, that is like unto a party-coloured curtain." He adds, that in England it is usually called

1. BROWN BENT GRASS. *Agrostis canina.*
2. BRISTLE-LEAVED B. G. *A. setacea.*
3. FINE B. G. *A. vulgaris.*

Pl. 259.

Painted Grass, or Ladies' Laces, and that it had "long ago been respected and cherished in the country gardens of many gentlewomen."

6. (19) Sea-reed (*Ammóphila*).

1. **Common Sea-reed** (*A. arundinácea*).—Panicle close, cylindrical, tapering; empty glumes acute, hairs one-third the length of glume; root-stock stout, creeping, and perennial. This is the common Marum, Marram, or Matweed of our sea-shores, and one of the most useful plants on the wide, dreary, sandy flats so often seen there. It often grows in large masses, its numerous and strong roots, sometimes twenty feet long, serving to hold down those drifting sands, which else might rise in overwhelming heaps to desolate the neighbourhood, and which would prove as injurious as an overflow of ocean itself. Stillingfleet recommended that this grass should be sown on such sandy banks as were without it, and it has been extensively planted in Norfolk, and is carefully grown in Holland. Were it not for this plant and its allies, the Lyme-grass and the rough Sea-sedge, many parts of our coast would be exposed to the most alarming incursions of sand. It is not alone in countries like Egypt, where vast regions of sand prevail, that immense tracts of land have been covered by its inundations. Several instances have occurred in this kingdom of injuries done by them, as in the well-known one of the estate of Coubin, near Forres, in Scotland, where, in 1769, the encroachments of drifting sand had, in one season, completely buried this valuable property, so that only the upper part of an apple-tree was left visible. This calamity was caused entirely by the poor in the neighbourhood having pulled up the grass for household uses. In the reign of Queen Elizabeth an Act was passed to restrain this practice, and commanding that the growth of this Mat-grass should be encouraged. It has been planted in the Hebrides for preventing sand-drift, and its abundant growth on the large sand-bank called Spurn Point is considered to have been the means of saving the town of Hull from having been washed away by the sea. Spurn Point, originally a drifting sand, has been rendered firm in the course of years by successive growths of this bent; and on this sandy mass the ocean pours the violence of its first swell before it reaches the town. The sand-hills about Calais are held down in a similar way by a plentiful growth of this plant.

This Sea-reed is abundant on many loose sandy shores of these islands; its stem is three or four feet high, and its close panicle, tapering at both ends, is, in July, three or four inches in length. The foliage, which is very long, rigid, and of a sea-green tint, has not so bluish a hue as that other useful sand-plant, the Lyme-grass. Its creeping roots have little tubers like beads at the joints. This plant is never found on inland soils, and when by a succession of growths its masses have formed by their tough roots a firmer soil, the grass disappears. It has performed its service in the economy of nature, has bound the once shifting sands, and it gives way to plants of another character. Its coarse hard foliage is not relished by cattle, hence it is not cropped, and its tall, greenish, straw-coloured, stiff stalks rustle to the winds of autumn, unless the poor people in the neighbourhood gather them for weaving into mats, or binding them into ropes for rustic uses. In

the Hebrides it is manufactured into mats for pack-saddles, and into vessels for holding grain or meal. It is a source of great regret that in this country there are many hundred thousands of acres of sea-sand, having all the advantages of climate and of the excellent manure afforded by the refuse of ocean, rendered useless by their want of solidity of soil, and yet too firm for the growth of mat-grass. Various means have been suggested for rendering these sands useful to the agriculturist, and Dr. Paterson of Glasgow stated to the British Association in 1855, that he had seen a small sheltered corner, of which the soil was no better or other than that of a common sand-hill, which had been reclaimed from waste by the owner, and was then green with the waving produce of clover. In future days, therefore, means may be found of converting these tracts of sand into useful fields.

2. **Baltic Sea-reed** (*A. baltica*).—Panicle elongated, loose and irregular; flowering glume lance-shaped, the pencil of hairs at its base half as long. This species is very similar to the last in its general habit, but its panicles are less cylindrical and less compacted, and the nerves on the flowering glumes are less strongly marked. It flowers in August and September, and occurs only on Ross Links and Holly Isle, Northumberland.

7. (12) Cat's-tail Grass (*Phléum*).

1. **Common Cat's-tail** (*P. praténse*).—Panicle cylindrical; empty glumes, as if cut off at the end, tipped with a spine, and fringed on the keel, longer than the awn. Perennial. This is one of the commonest of our meadow plants, growing well on dry poor soils, and retaining its verdure longer than most grasses. It becomes troublesome on dry gravelly soils, by means of its creeping stems (var. *stolonifera*), which in some situations become tuberous (var. *nodosum*). This Cat's-tail is in this country used chiefly for hay, being a hard coarse grass, little relished by cows, horses, or sheep, but affording, if made into hay just when ripening its seeds, a fair supply of nutriment. It is in England sown with other grasses, but Professor Buckman says it is admirably adapted for a self-crop, and is one of the most commonly used grasses for this purpose in America, its herbage being in that land much coarser than in ours, and its stems often four feet high, with flower-spikes four inches long. "In the States of New York and Pennsylvania," says this writer, "I saw hundreds of acres of the best cleared land occupied solely with this grass, of which, indeed, the great bulk of the grass hay of the country is made. Here so strong does it grow as at a slight distance to be capable of being mistaken for a grain crop." The grass grows slowly after cutting, and is late in ripening its seeds, hence its aftermath is not abundant, but its power of resisting drought induces this botanist to infer that it would be a good grass on dry upland or sandy soils. Hares are very fond of its herbage.

This Cat's-tail is from a foot to a foot and a half high, its leaves rather broad, rough, and furnished with long sheaths, and its panicle, which appears in June, is from two to four inches long, varied with green and white. It owes its common name of Timothy-grass to Mr. Timothy Hanson, who cultivated it extensively in the United States.

2. **Alpine Cat's-tail** (*P. alpínum*).—Panicle egg-shaped, somewhat

1 MARSH BENT GRASS.
Agrostis alba.

2 SPREADING SILKY B. G.
A. spica-venti.

3 DENSE-FLOWERED SILKY B. G.
A. interrupta.

4 WHORL G.
Catabrosa aquatica.

oblong; empty glumes fringed at the back, cut off suddenly at the end, shortly bristled, sheath of the upper leaf very long and swollen. This rare grass is found on the banks of alpine streams at altitudes between 2,100 and 3,600 feet in Perth, Forfar, and Aberdeen. It has a very short bristly panicle, rarely exceeding an inch in length, of a purplish-brown colour, and a creeping knotted perennial rootstock. It varies in the degree in which its leaf-sheath is inflated, as well as in the roughness of its awn.

3. **Rough Cat's-tail** (*P. ásperum*).—Panicle cylindrical; empty glumes wedge-shaped, swelling upwards, rough. Annual. This is a rare grass of dry open fields in some parts of England. Its stem is about a foot high, often branched, and in July its leaves are so long and numerous that they almost cover the flower. The panicle is about two inches long. It has been found occasionally in fields about Bristol, and in other parts of Gloucestershire, but not apparently in recent years.

4. **Purple-stalked Cat's-tail** (*P. bœhméri*).—Panicle cylindrical; empty glumes narrow, pointed, spine-tipped, and downy at the keel. Perennial. This rare grass grows chiefly on dry sandy or chalky fields in Bedfordshire, Norfolk, Cambridgeshire, Essex, and Hertfordshire. It has a glossy purple unbranched stem, erect, and about a foot high, and but few leaves. It flowers in July. The glumes are leathery, green, with a white margin. It is also known as *P. phalaroides.*

5. **Michel's Cat's-tail** (*P. michélii*).—Panicle hairy, cylindrical; empty glumes tapering to a point, with a fringed keel. Perennial. This is not an indigenous grass. It was stated to be found on the rocky parts of the Clova mountains by G. Don, but, as it is not found there now, some mistake is supposed to have occurred.

6. **Sea-side Cat's-tail** (*P. arenárium*).—Panicle oblong, enlarged at the top; empty glumes tapering to a point, fringed on the keel. Perennial. This is one of our sand-grasses, of which we have no fewer than seventeen, all more or less useful in binding the sands. It grows more frequently on the eastern sea-shores of Scotland than England, and though its stem varies in height it is most frequently about half a foot, several stems rising from one root. Its short, crowded, oblong panicle is of yellowish-green, often tinged with a little pinkish colour. It will grow only on loose sands, and is there a straw-coloured, bright glossy grass in June and July, and, like our sand-grasses in general, of no use to the agriculturist.

8. (20) Hare's-tail-grass (*Lagúrus*).

Ovate Hare's-tail-grass (*L. ovátus*).—Spikes egg-shaped, with long awns projecting from among the down. Annual. This is a rare grass, inhabiting sandy places in Guernsey, but naturalized near Saffron Walden, and occasionally planted in tufts in English gardens. It is from four to twelve inches high, with broad leaves and a soft downy head, over an inch long, of pale grayish colour, slightly tinged with pink.

9. (11) Millet-grass (*Milium*).

Spreading Millet-grass (*M. effúsum*).—Branches of the panicle long, and in distant tufts, placed alternately on the stem. Perennial. This is a

tall slender grass, conspicuous in our moist shady woods, where it is often very abundant, its stem rising to the height of four feet, and its broad smooth leaves of a delicate bright green colour. In June it bears numerous very small light green spikelets, the middle branches of the panicle drooping. It is a very elegant grass, and in winter its tall slender stems and branches, turned to a pale straw-colour, often occupy a large space of ground when flowers have faded away from the wood. The grass is not a nutritious one for cattle, but birds eat the seeds.

10. (16) Nit-grass (*Gastridium*).

Awned Nit-grass (*G. lendigerum*).—Panicle spiked; empty glumes tapering to a point, shorter than the awn of the flowering glume. Perennial. This little grass, which varies in height from four to eight inches, bears in August a close panicle of numerous pale yellowish-green glossy florets, much swollen at the base, and their form affords a ready means of identifying the plant. It is a rare grass, growing in the maritime counties, generally in sandy places where water has stood during winter.

11. (10) Feather-grass (*Stipa*).

Common Feather-grass (*S. pennata*). — Awns very long, fringed throughout their length; leaves rigid and bristle-like. Perennial. This is included in our list of British Grasses, because it is said to have grown, in the time of Dillenius, on limestone rocks near Kendal in Westmoreland; but as it has not been seen there since 1720, it was no doubt a garden escape. Most persons are familiar with it as a garden ornament in summer, its long feathery tufts, so like the tail feather of a Bird of Paradise, growing two or three feet high. Gerarde mentions that this grass was in his time worn in the hair instead of feathers; and Parkinson, writing somewhat later, refers to its use as an ornament by ladies, after recent illness. "I have knowne," he says, "that many gentlewomen have used it, being tyed in tufts to set them about their beds, which have been much admired of the ladies and gentlemen that have come to visit them." The grass is a native of dry rocky and sandy spots in the south of Europe, and is very common in Austria. It is easy of cultivation, provided that the seeds are sown soon after they are ripe.

12. (6) Beard-grass (*Polypogon*).

1. **Annual Beard-grass** (*P. monspeliensis*). — Panicle crowded and spike-like; awns remarkably long; empty glumes rough and blunt. Annual. This light and elegant Grass is found only in a few moist meadows near the sea, in Hampshire, Sussex, Kent, Essex, and Norfolk. Its dense silky panicle is, in July and August, beautifully tinted with different shades of green and pale greyish-purple, and is one or two inches long, on a stem from 6 inches to 4 feet high. It has slender hairy leaves, and is a very common grass in Southern Europe.

2. **Perennial Beard-grass** (*P. littoralis*). — Empty glumes smooth, tapering to a point, and with awns about their length. This, too, is a rare grass, occurring in muddy salt-marshes, as in those near Woolwich, and on

1. TUFTED HAIR GRASS.
Aira cæspitosa.

2. SMOOTH ALPINE H. G.
A. alpina.

3. WAVED H. G.
A. flexuosa.

Pl. 261.

the coast of Essex, as well as in Norfolk and Hants. Its stem varies from a foot to 6 feet high, and it bears in July its close purplish panicle. Its leaves are somewhat broader than those of the last species, of a bright green, and it has a creeping rootstock. Duval-Jouve regards this as a hybrid between the last-named and *Agrostis alba*.

13. (15) SMALL-REED (*Calamagróstis*).

1. **Wood Small-reed** (*C. epigéjos*).—Panicle upright; spikelets crowded, 1-flowered; empty glumes awl-shaped, rough; awn of outer flowering glume nearly as long as the glume; hairs much longer than the awn. Perennial. This is a handsome, though rigid plant, with a round erect stem, sometimes five feet high; and narrow acute leaves, hairy on the inner, and smooth on the outer sides. The green one-sided panicle is more or less tinged with brown, with silky hairs, and about half a foot long; flowering in July. This Reed-grass is not common, but grows in moist shady woods in many places throughout the kingdom. It is far too harsh a grass to be touched by cattle.

2. **Purple-flowered Small-reed** (*C. lanceoláta*).—Panicle erect, loose; empty glumes smooth; awn short, from the notch in the flowering glume; hairs long. Perennial. This grass, with its slender stem three or four feet high, and graceful silky panicle, with an abundance of scattered spikelets, is —in England—far more common than the last, and in moist hedges often towers above the bushes, its glossy clusters of flowers being, in June, of a rich purple hue, much smaller, but much prettier in colour than that of the last species. It does not occur in Scotland or Ireland.

3. **Narrow Small-reed** (*C. stricta*).—Panicle erect, close; empty glumes acute, rough on the keel; flowering glume as long as the glumes, longer than the hairs; awn straight. Perennial. This reed is the smallest of the species, and has an upright stem two or three feet high; bearing, in June, a close panicle of many spikelets, about three inches long, and tinged with purplish-blue colour. Its leaves are broad and rigid. It is a very rare plant, inhabiting bogs and marshes in Delamere Forest and Caithness. It is readily distinguished from the other species by its general appearance, and the colour of its flowering clusters. By some systematists it is separated from *Calamagrostis*, and called *Deyeúxia neglécta*.

14. (14) BENT-GRASS (*Agróstis*).

1. **Brown Bent-grass** (*A. canína*).—Branches of the panicle long, slender, spreading, when in full flower, and erect; glumes unequal, rough at the keel; flowering glume single, toothed, awned from below the middle. Perennial. This is a very abundant Grass on boggy meadows, and one often gathered for its delicate beauty. Its glossy stem is one or two feet high, prostrate below; and in June and July its airy clusters, formed of numerous small spikelets on thread-like branches, vary in tint, from pale yellowish-green, to every hue of purple. It generally grows about the moors in little patches, and it has slender, smooth leaves.

2. **Bristle-leaved Bent-grass** (*A. setácea*).—Panicle close, oblong; branches and flower-stalks rough; glumes unequal; outer flowering glume

toothed with an awn twice its length. Perennial. This is a plant almost confined, in this country, to downs at the south and south-west of England. It has numerous rigid bright green leaves growing in tufts from the root; and bears, in June and July, numerous oblong panicles with short branches. It is said that no grass is pleasanter to the feet than this, and that the large natural downs which are composed of its turf, in Devonshire, are as neat as the best kept lawns. They need no mower's hand to keep them so; nor, indeed, would these rigid leaves and stems yield to the scythe. On the open downs of Cornwall, this grass, dwarf furze, and heather, constitute the principal vegetation. Its range extends from Cornwall to Sussex, and it is frequent in Surrey, Berkshire, and Glamorgan.

3. **Fine Bent-grass** (*A. vulgáris*).—Panicle spreading, its branches almost smooth; glumes nearly equal; flowering glume thin and unequal; perennial; spikelets, in one variety awned, in another awnless. There is also a dwarf variety of this plant, not more than three inches high. This Bent is very common in every part of the kingdom; in meadows and pastures, and by road-sides; at the base of walls, or on other dry spots, often growing in great plenty. Its slender stem is a foot and a half high; and it bears, in June and July, clusters of numerous purplish spikelets, so delicate, and on branches so hair-like, that they quiver in every summer breeze. The small quantity of slender herbage which this grass produces is in perfection by the middle of April, and supplies a good, though slight pasture for cattle. This grass is often called Black Quitch.

4. **Fiorin or Marsh Bent-grass** (*A. álba*).—Branches of the panicle spreading when in flower, afterwards compact; glumes nearly equal; stems erect, but somewhat prostrate at the base; and in the variety called *stolonífera*, rooting and throwing out long runners. This is a perennial, and very common grass, stouter and taller than the preceding, growing abundantly in meadows, on sunny slopes, and by road-sides, being in leaf early in May, or, in forward springs, during April. It is a remarkably fertile plant, producing a large number of suckers; and it affords an excellent pasture for sheep. The short, flat, narrow, and acute leaves are rough on both sides; and its flowers, which appear in July and August, are sometimes of a paler yellowish-green than those of most of the species, but are quite as often of a purplish colour; the stalk is frequently a foot and a half or two feet high, though few grasses vary more on different soils.

5. **Spreading Silky Bent** (*A. spica-vénti*).—Panicle loosely spreading; glumes unequal; awn straight, very stiff, and three or four times the length of the flowering glume. Annual. Slender and delicate as are all the species of *Agrostis*, and remarkable for their small spikelets, yet none are graceful and airy like this. The light and elegant panicle is often six inches long, and of pale green, but sometimes of pinkish hue, leaning on one side, and glossy as satin, nodding to every breath of the midsummer wind which sweeps across the sandy fields where it grows. Its rough and slender awns are many times as long as the spikelet. It is a rare grass, and found only in the counties between Yorkshire, Kent, and Hampshire. On spots occasionally inundated it becomes very luxuriant, its stem rising to the height of three feet, though, usually, about one or two feet only. Its long awns would prevent its being

1. GREY HAIR GRASS. Aira canescens.
2. SILVERY H. G. A. caryophyllea.
3. EARLY H. G. A. præcox
4. PURPLE MOLINEA. Molinea cærulea.
5. MOUNTAIN MELIC GRASS. Melica nutans
6. WOOD M. G. M. uniflora.

Pl. 262

mistaken for any other grass except the following. The inner glume contains a small neuter floret, with a tuft of hairs at its base. By some botanists it is separated from *Agrostis* and constituted a genus under the name of *Apera*.

6. **Dense-flowered Silky Bent** (*A. interrúpta*).—Panicle close, long slender; glumes unequal; flowering glumes with straight long awns. Annual. This grass differs from the last in its close, never-spreading panicle; and in the more rounded form of its anthers; but it resembles it in structure in other respects, and is apparently only a sub-species of it. It flowers in July, and its stem is rarely more than half a foot in height.

15. (35) Whorl-grass (*Catabrósa*).

Water Whorl Grass (*C. aquática*).—Panicle with half whorls of spreading branches; spikelets usually with two, sometimes 3—5 florets; glumes thin and blunt; flowering glumes thick, white, and clear at the extremity. Perennial. This is an aquatic grass, sometimes floating to a great length in the water, at others growing on wet banks, when it becomes much smaller, and has a stem but a few inches high. The panicle of this Whorl-grass is composed of a large number of small spikelets, bluish, or often brownish-green, on very slender branchlets; the stem is stout, and one or two feet long, bending at the base, and sending out roots. The leaves are broad, blunt, and bright green; and the flowers, which appear in May and June, have a sweet flavour, the whole plant having more or less of a sweetish taste. Waterfowl are fond of its young leaves and shoots, while cattle relish it so much, that were the grass not an aquatic, it would doubtless be cultivated for their pasturage. It is said to contribute to the excellence of the Cambridge butter and the Cottenham cheese.

16. (21) Hair-grass (*Aira*).

1. **Tufted Hair-grass** (*A. cæspitósa*). — Panicle spreading, branches rough, flexuous; glumes sometimes rough at the mid-rib; awn inserted near the base of the outer flowering glume, and scarcely extending beyond its summit. There are several varieties of this species, but scarcely of a permanent character. This is a common and very pretty perennial grass; it is found in abundance on field-borders, and especially on moist moory ground, where it flowers, in June and July, among spearworts and other marsh flowers, and thick green mosses. On such spots, especially if shaded by furze and brambles, it attains great luxuriance; but when the land is drained it soon disappears; and when we see it, as we often do, growing with the different species of sedge (*Carex*), and with the roughish meadow-grass, we have sure indication that the land is not in good condition. It is commonly known in country places by the name of Hassock or Tussock Grass; and its large matted tufts cause those clumps called tussocks, which the mower finds so great a hindrance to his scythe. It is also termed Rough-caps, from its long, narrow, rough, twisting leaves, which are marked with fine lines. Bullfaces and Silver-grass are also among its familiar names.

This Hair-grass has a strong stiff stem, two or three feet high, and its light and graceful panicle is of a dull purplish hue, but when glistening in

the midsummer sunshine, its numerous small spikelets look as if cut out of silver. It is a hard rigid grass, and is refused by horses, while cows will only eat it when compelled by hunger. This species and *A. flexuosa* are separated from *Aira* by some authors to constitute the genus *Deschampsia.*

2. **Smooth Alpine Hair-grass** (*A. alpina*).—Panicle close; glumes smooth on the midrib; awn from about the middle of flowering glume, and scarcely longer than the glumes. Perennial. This, which is usually a viviparous grass, grows abundantly on the mountains of Scotland and the west of Ireland, on moist rocks, ascending to over 4,000 feet. It has a glossy stem, a foot or a foot and a half high, its leaves are rough within and smooth on the outer surface, and often turning backwards. The panicle, which appears in June and July, is very light, slightly drooping, and composed of numerous pale brown shining spikelets, on nearly erect branches. The plant is by some regarded as a sub-species of *A. cæspitosa.*

3. **Wavy Hair-grass** (*A. flexuósa*).—Panicle spreading, with hair-like branches; awn inserted near the base of the flowering glume, and extending far beyond it. Perennial. This grass has a slender erect smooth stem, a foot or a foot and a half high, and bears, in July, a pale greenish-brown, glossy, erect panicle. The brown or purplish spikelets are much smaller than in the preceding species, and the wavy angular branches are not thicker than the most delicate sewing-thread. It grows abundantly on hill sides and heathy places, and has long, slender, bristle-like leaves. The variety *montana* has larger glumes, more purple in hue, and affects subalpine situations.

4. **Grey Hair-grass** (*A. canéscens*).—Panicle long and crowded; empty glumes taper-pointed, longer than the flowering ones; awn short, club-shaped, from near the base of the flowering glume. Annual. The tufted stems of this grass are six or eight inches high, and bear, in July, panicles of numerous spikelets, variegated with purple, green, and white, the awns being purplish-white, and the anthers purple. Its leaves are numerous and bristle-like. It is a very rare grass, found on the sandy sea-coast of Dorset, Norfolk, and Suffolk, and the Channel Islands; it has also been gathered from the chalk between Folkestone and Dover, in Kent. Some authors separate it from *Aira* on account of the clubbed awn, and write its name *Corynephorus canescens.*

5. **Silvery Hair-grass** (*A. caryophýllea*).—Panicle spreading, branches three-forked; spikelets blunt at the base; glumes nearly equal, rounded at the base, the upper part clear and white; awn longer than the glumes; outer flowering glume deeply cleft. Perennial. This is a frequent grass on gravelly heaths and pastures, its often purplish stem rarely a foot high. It has a few short bristle-like leaves at its root, and several small rough ones on its stem. It flowers in June and July. Its panicle is of a silvery grey colour, and the spikelets are very small.

6. **Early Hair-grass** (*A. præcox*).—Panicle spike-like, oblong; awn much longer than the cleft flowering glume, and from below its middle. Annual. This little grass, inhabiting sandy hills and pastures, is rarely more than three or four inches high. Its panicle, which appears in May and June, is very small, erect, and close, and has few spikelets, often not more

1. CREEPING SOFT GRASS.
Holcus mollis.

2. MEADOW S. G.
H. lanatus.

3. COMMON OAT LIKE G.
Arrhenatherum avenaceum.

4. NORTHERN HOLY G.
Hierochloe borealis.

5. CRESTED KOELERIA
Koeleria cristata.

Pl. 263.

than a dozen. They are yellowish or purplish green, somewhat tinged with silver colour, but less so than most of the species, and they are rather pointed at the lower end. The florets have scarcely any hairs at the base. The leaves are few, slender, and bristle-like. In dry seasons it withers very early.

17. (34) MOLINIA (*Molínia*).

Purple Molinia (*M. cærúlea*).—Panicle erect, narrow; spikelets erect, violet, 2 or 3-flowered, oblong, narrow; flowering glume much longer than the empty glumes. Perennial. This grass flowers in August and September, later than almost any other, and is common on heaths and moory grounds. Its stem is usually two or three feet high, and has a single joint near its base, but grows much taller when sheltered by the furze-bushes or ling of the moist moor. The panicle is of a much deeper hue than any other of our native grasses; for although a variety found at a great elevation on the Clova mountains, and called *depauperata*, has numerous, pale green, one-flowered spikelets, yet our grass has usually a tint as deep as that of the myrtle leaf, with a dark tinge of bluish-purple spread over it, and large purple anthers. Its spikelets are small but numerous, 2—3-flowered, and the panicle is from three to six inches long, with numerous waved branches. The leaves are long, slender, and taper-pointed. The long straws of this grass are said by Withering to be made, in country places, into carpet-brushes, and twisted together they form a durable line used by fishermen. The root has large thick fibres.

18. (36) MELIC-GRASS (*Mélica*).

1. **Mountain Melic-grass** (*M. nútans*).—Panicle almost a raceme; its spikelets large, hanging on short stalks, which are rarely branched, from one side of the stem, oval, and with two flowers, the upper perfect, the lower male; glumes oval; flowering glumes unequal. Perennial. This grass has many long, thin, bright shining leaves, and a stem about a foot high. Its flowers appear in May and June; the glumes are of a purplish-brown colour, with a white margin. It is found in shady places and woods in hilly and mountainous countries, in Scotland and along the west side of England as far south as Hereford. Cattle do not relish it.

2. **Wood Melic-grass** (*M. uniflóra*).—Panicle branched, slightly drooping; spikelets erect, oval, two-flowered, the lower perfect, the upper male. Perennial. This is one of our most common vernal grasses, nodding to the breeze of May, beside the primroses and bluebells. It is very abundant in some woods; and its large spikelets standing on a slender stem, a foot or more high, and each on a hair-like stalk, would hardly fail to be noticed by any lover of flowers. The spikelets are few, and distant from each other, erect, and of a purplish-brown hue, variegated with white and green. Cattle relish the soft, drooping, bright green leaves, which are marked on both sides with lines. It flowers early in summer, but the glumes retain their form long after the seed is shed.

19. (24) SOFT-GRASS (*Hólcus*).

1. **Creeping Soft-grass** (*H. móllis*).—Panicle loose; glumes tapering to a point; awn rough; joints of the stem hairy. Perennial. This grass,

owing to its long, creeping, knotted rootstock, is very difficult of extirpation, and when it grows, as it often does, in corn-fields, it is very troublesome. Mr. Loudon remarks of it, that it is the true couch-grass of light sandy soils; and long runners, which were but the result of a few months' growth, have been found extending themselves five feet beneath the surface of the soil. It grows in uncultivated fields and thickets, and is very common by road sides, but is rarely a meadow-grass. It bears, in July, a light and elegant erect panicle, of numerous small spikelets, which is much like that of the next species, but not so ornamental, being rarely tinged with pink, and mostly of a dull greenish-white hue. Its stem is from one to three feet high; its leaves lance-shaped, rather broad, and light green; and the knots of its stem usually woolly. The root shoots are very nutritious, and when taken up are readily eaten by cattle; but the dry, soft, insipid herbage is little relished by them.

2. **Meadow Soft-grass** (*H. lanátus*).—Panicle loose; glumes rather blunt, spine-tipped; awn smooth, except near the extremity. Perennial. We have only to walk abroad during June and July into the wide-spread meadow lands, and we shall be sure to see this grass. It grows on all soils, from the richest to the poorest, but its prevalence always indicates a poor and moist meadow. Its beautiful soft panicle, composed of innumerable small spikelets, crowded together, tinged with pink, often deepened into rich pinkish-purple, is large and conspicuous, though its brightness disappears as the grass gets older. It then, if abundant, whitens the pasture, so as to deserve its old name of Yorkshire Whites, or even of Yorkshire Fog. It is not unlikely, however, that it owes its latter name to its softness, which led to its comparison with moss, for which fog was an olden name, and by which it is yet called by North-country people, who allude to moss in their familiar proverb:

"The ro'ing stane gathers nae fog."

Our Meadow Soft-grass is one or two feet high, and has a fibrous root. Curtis says of it, that when it is in flower the farmer thinks his grass-land fit for the scythe. The herbage, as well as the flowers, is covered with soft down. It is not sufficiently succulent to be liked by cattle, and both leaves and flowers often remain untouched on meads when other grasses have been cropped all around them. Its nutritious properties are said to consist of mucilage and sugar; but it would appear that the properties most relished by our herbivorous animals are either sub-acid or saline.

20. (27) Oat-like grass (*Arrhenathérum*).

Common Oat-like grass (*A. avenáceum*).—Panicle long and loose; rootstock creeping, perennial. A variety of this grass, *bulbósa*, has swollen or tuberous nodes, and is commonly called Onion Couch. The Oat-like grass is, during June and July, a tall conspicuous plant; its panicle, composed of rather large spikelets on slender branches, is often a foot and a half long, of a bright brown, or so tinted with shades of green and lilac as to shine in the sunshine as if with metallic lustre. This grass is sometimes five or six feet in height, and it is as common as it is beautiful, for it nods in the hedge

1. BLUE MOOR GRASS.
   Sesleria caerulea.
2. LOOSE PANICK G.
   Panicum crus-galli.
3. ROUGH BRISTLE G.
   Setaria verticillata.
4. GREEN B. G.
   S. viridis.

or woodland by the briar-roses, or overtops the corn, or glistens in the meadow just ready for the scythe. Wherever it grows in abundance we may infer that the soil is poor, and it is most likely to be either of a clayey or light sandy nature, as this plant does not prevail on stiff rich soils. The bulbous variety, the Onion Couch, forms little strings of knobs, like small onions, at the base of its stem, and is so troublesome in corn-fields that when abundant it is often dug up and burned. Professor Buckman remarks of it, that it is a pest on such lands as are frequently to be met with in some parts of Worcestershire, which is mostly made up of disintegrated slabs of new red sandstone; or again at Cheltenham, where are thick beds of ancient marine sands, filling up hollows in the lias. In the latter, which is much used for garden ground, for which it is peculiarly adapted, the Onion Couch has to be picked out in digging with great care, otherwise the evil is continued, as the smallest portion left behind grows with great rapidity.

The stem of the Oat-grass is round and shining; its leaves are lance-shaped, narrow, pointed, and rather hairy. The herbage has a bitter unpleasant flavour, and it is this bitterness probably which makes it unpalatable to cattle, otherwise it would be a valuable pasture grass, both on account of the early growth of its foliage and the large supply which it yields.

21. (9) Holy-grass (*Hierochloe*).

Northern Holy-grass (*H. boreális*).—Panicle straggling; stalks of the spikelets smooth; glumes egg-shaped, unequal; flowering glumes awnless; rootstock creeping. Perennial. This grass has a thick stem, a foot or a foot and a half high. Its panicle is composed of rather large purplish-brown spikelets, with very conspicuous pale brown anthers. It is an extremely rare grass, being found only on wet banks in Caithness. Its scent is sweet, like that of our Vernal-grass, and it takes its English familiar name from the uses to which it is applied in some parts of Germany, where the plant is dedicated to the Virgin Mary, and strewed in the aisles of churches and around the doorways on festival days. It grows in abundance in Iceland, and there, as in other parts of Northern Europe, it is laid in bundles among linen, or hung up in rooms, for its fragrance. Its odour is also believed to cause sleep, and in Sweden it is sold in bundles for this use.

22. (33) Koeleria (*Koelèria*).

Crested Koeleria (*K. cristata*).—Panicle compact and spike-like, interrupted below; glumes flattened, acute; flowering glumes white and thin. Perennial. This rare, or rather local plant, grows in dry pastures near the sea, mostly in the north. Its downy stem varies from a foot to a foot and a half in height; its leaves are rough, and fringed on the edges. It flowers in June and July, and its spikelets vary as to downiness, being sometimes quite smooth, and of a greenish silvery hue.

23. (31) Moor-grass (*Sesléria*).

Blue Moor-grass (*S. cærúlea*).—Panicle oval, slightly one-sided; outer flowering glume jagged, and with a short point. Perennial. This is a very beautiful early flowering grass, bearing its short greyish-green cluster from

March to June. This changes as it grows older into a purplish-blue colour, and its large anthers are of a deep purple hue. In continental countries both flowers and foliage are of a deeper and more decided blue than on our mountains. The stem of the Moor-grass is from six to eighteen inches high, and its leaves are rather blunt, with a minute point, and rough on the keel and edges. It is most abundant in limestone districts in the north of England, and grows also on the banks of the Shannon.

24. (1) Panick-grass (*Pánicum*).

Loose Panick-grass (*P. crus-galli*).—Spikelets alternate or opposite in panicles; glumes 2, lower small; flowering glumes awned, or tipped with a short, rough spine. Annual. This is a coarse grass, not truly wild, but naturalized in moist fields about the south-east counties of England. The spikelets are near together, and at the base of each are two or three long bristles. The leaves are broad, harsh-edged, tinged with purple, and the seeds are very large. It flowers in July. *Digitaria* is included in this genus by some authors.

25. (2) Bristle-grass (*Setária*).

1. **Rough Bristle-grass** (*S. verticillata*).—Panicle spike-like; bristles of the spikelets rough, solitary or in pairs, with erect teeth; flowering glumes smooth, very hard and firm. Annual. This is a naturalized grass, very local, and rarely plentiful on any spot. It has been found about London and Norwich, in cultivated fields, and bears in June and July its pale green, or pinkish, or deeper purple flowers.

2. **Green Bristle-grass** (*S. víridis*).—Panicle spike-like; bristles clustered, rough, with teeth which turn downwards; flowering glumes smooth. Annual. The crowded spikelets of this grass, with long, rough bristles at their base, are usually green, though occasionally tinged with purple. It flowers in July and August, growing in cultivated fields from Aberdeen to Devon and Kent, but is not a true native of Britain.

3. **Glaucous Bristle-grass** (*S. glaúca*).—Panicle spike-like; bristles with erect teeth; flowering glumes wrinkled. Annual. This species is distinguished chiefly by the wrinkled glumes. It has long, slender leaves, hairy at the base, and its bristles are numerous and rigid. It flowers in October, but is not a native, and occurs only casually in corn-fields.

26. (39) Meadow-grass (*Póa*).

1. **Reed Meadow-grass** (*P. aquática*).—Panicle erect, much branched; spikelets oblong, many-flowered; empty glumes small, egg-shaped, thin; flowering glumes much larger than the empty glumes. Perennial. The margins of our rivers, lakes, and standing waters have their grassy borders, among whose herbage grow some of the brightest of our wild flowers. One of the tallest and most plentiful of the grasses by the river is this Reed Meadow-grass, which grows either by the side of flowing or standing waters in great abundance. It might serve by its height to remind us of the grasses of warmer climates, for its stout stem is occasionally, in favourable situations, six feet high. It is a native of most parts of Europe, and abounds in the fens

1. REED MEADOW GRASS.
   Poa aquatica.
2. FLOATING M.G.
   P. fluitans.
3. CREEPING SEA M.G.
   P. maritima.
4. REFLEXED M.G.
   P. distans.
5. BORRER'S SEA M.G.
   P. borreri.
6. PROCUMBENT S.M.G.
   P. procumbens.

of Lincolnshire and Cambridgeshire, where it is sometimes cut down three times in a year, forming not only a rich pasturage all the summer, but constituting a large portion of the winter fodder for animals. It grows not only on the moist lands watered by rivers, but in the water itself, and may be seen rising above the elegant leaves of the arrow-head, and the broad foliage and rose-coloured flowers of the water plantain, and waving about like a plume far above the surface of the stream. Owing to the rapid growth of this, as, indeed, of most aquatic plants, it soon fills up the standing pools, and even when the water of the river runs but slowly it gains ground very quickly, sending out its powerful creeping stems, and taking firm hold of the soil. On this account it sometimes proves a formidable impediment to the drainage of moist districts. Curtis says of it that the waters in the Isle of Ely become so encroached upon by this and other aquatics that they are obliged to be cleansed by an instrument called a bear, which being drawn up and down the streams tears up the water-plants by their roots.

The large, repeatedly branched panicle of this grass is, during July and August, composed of a great number of brownish-green spikelets; the slender branches of the panicle are rough, the leaves are long, broad, and of a bright green colour, taper-pointed, and smooth. The plant when dry is used by country people in packing goods, and also mingles with the stems of other large grasses and sedges in the thatch of the barn or cottage. This and the following five species are detached by some authors to comprise the genus *Glyceria.*

2. **Floating Meadow-grass** (*P. fluitans*).—Panicle nearly erect, very long, and slightly branched; spikelets long, slender, roundish, but slightly flattened, with many flowers; outer flowering glume very long, with seven prominent ribs and a ragged tip; rootstock creeping and perennial. This thick, succulent grass often grows abundantly in ditches and stagnant waters, its stem rising to the height of three feet, with long, narrow, pale green leaves, rough on both sides, often folded at the keel. The nearly erect panicle expands in July and August, and we have seen it lingering yet amidst the November gales. It is long and slender, with slightly roughish branches, arranged usually in twos and threes. The spikelets, which are varied with pale delicate green and white, and have purplish anthers, are sometimes on short, undivided stalks. The seeds of this plant are large, but in this country are not plentifully produced. They are almost as nutritive as grains of wheat, and are in some countries used as food. These seeds constitute the manna-seeds of commerce, and in Holland, as well as in some parts of Poland and Germany, they are gathered in great quantities, and used for food. De Theis remarked, that he had seen the Polanders in the suite of King Stanislaus gather these manna-seeds on the banks of the Meurtha. It is abundant in Germany, on the margin of standing waters, as well as on very wet meadows; and Meyen observes of it, that "round Berlin, where the plant grows singly, no one thinks of the well-tasted seeds which it bears; but further east, in East Prussia, Masuria, and the Lower Vistula, it grows in such quantities that the seeds are gathered with great profit, without the plants having been previously sown." Several fine kinds of groats for gruel are made of these seeds, and they are sold in shops under the name of manna-

seed. The grains are eagerly eaten not only by water-fowl and other birds, but also by fish, especially the trout. The long narrow leaves, too, which lie floating on the surface of the water, form a sweet herbage for horses and cattle; and the cows may be seen on a summer, or even a winter day going far into the pool to crop it, for it is green and nutritious and plentiful, even at the season when herbage is scarce.

3. **Creeping Sea Meadow-grass** (*P. maritima*).—Panicle erect, with its lower branches in pairs, or with spikelets on simple stalks; spikelets flattened, narrow; glumes taper-pointed; outer flowering glume firm and of purplish colour; rootstock creeping and throwing out long runners. Perennial. This is a short grass, varying in height from half a foot to a foot, and bearing, in July and August, a firm, rigid flower-cluster. It is often of a sea-green colour, the flowers tinged with purple, and the leaves generally folded, compressed, and pungent. It is a common seaside plant, growing mostly in marshes, or on the grassy banks of sea-walls, as on those of Dymchurch in Kent, and also on the borders of the River Medway in the same county; and is often so covered up with mud that one wonders how it can thrive at all.

4. **Reflexed Meadow-grass** (*P. distans*).—Panicle spreading; branches finally turning downwards, lower mostly in fours or fives; spikelets narrow and small of 3—6 florets; glumes short, unequal. Perennial. The round slender stem of this grass is often a foot and a half high, generally prostrate at the base, and the panicle, which appears in July and August, is light and graceful, with numerous rather small spikelets, on branches which are rough to the touch, and which bend downwards in the manner which characterises this species. Its leaves are smooth, flat, and unfolded. It is nearly allied to the last species, and is equally rigid, but the reflexed branches and smaller spikelets, as well as the tasteless leaves, distinguish it. In *P. maritima* the lower branches are always erect. It is also usually taller and more slender than that plant. It has fibrous roots, rarely with runners, and usually few leaves. It is rather a local grass, generally found on sandy pastures on the coast. Sometimes, however, it grows on the borders of brackish rivers, as on the muddy shores of the Avon, near Clifton, where it flourishes in great abundance, and is the companion of the Creeping Meadow-grass and of the Sea Procumbent Meadow-grass. It is rare in Ireland.

5. **Borrer's Sea Meadow-grass** (*P. borréri*).—Panicle spreading; branches short, lowermost ones generally in fours, often standing out horizontally from the stem, but when in fruit always erect; spikelets small, and of 4—7 flowers, narrow; flowering glumes truncate; stems tufted. Perennial. This grass is often found growing with the last two species in salt marshes, but only on the south and east coasts. Its leaves are short and flat, and remarkable for their long sheaths. Its panicle appears in July, and the spikelets are very much smaller than in the two preceding grasses, and the branches fewer. The stem is about a foot high. It is a local but not rare grass.

6. **Procumbent Sea Meadow-grass** (*P. procúmbens*).—Panicle compact, scarcely branched except at the lower part; branches upright, rigid, and never bending; spikelets narrowly lance-shaped, of about four flowers; flowering glumes small, blunt, ending in a hard point. Annual. This is a not

1. HARD MEADOW GRASS
Poa rigida.
2. DWARF WHEAT M. G.
P. loliacea.
3. FLAT STEMMED M.G.
P. compressa.
4. SMOOTH STALKED M.G.
P. pratensis.
5. ROUGHISH M.G.
P. trivialis.

infrequent grass on muddy sea-shores of England, though rare in Ireland, and absent from Scotland. The stem, which is round and smooth, always bends more or less at the base, and is from half a foot to a foot long, bearing, in June and July, its compact cluster, about two inches long, of small grass-green spikelets, turning all one way on their branches, which stand in two rows on the stem. Mr. Knapp remarks of this grass, that at Hartlepool, where seaweeds were burnt in order to obtain an alkaline salt for the alum works at Whitby, after showers of rain an alkaline lixivium floated in the yard from the stacks of sea-weed, destroying all vegetation; yet that this Grass, though not frequent in the neighbourhood, luxuriated there abundantly.

7. **Hard Meadow-grass** (*P. rígida*).—Panicle compact, erect, rigid, with branches in two rows, the branches being sometimes undivided so as to form a raceme; spikelets small and narrow, 7—10 flowered; glumes unequal and acute. Annual. This little wiry hard grass, with its rigid cluster one or two inches long, is common in June, on dry heaths, old walls, and rocks near the sea. The branches of the panicle are short and rough, or sometimes almost wanting; the spikelets growing close to the stem on very short stalks. The wiry erect stem is rarely more than five inches high, and the leaves very narrow, flat, and tapering at the point. The roots take very little hold of the soil. Also known as *Festuca rigida.*

8. **Dwarf Wheat Meadow-grass** (*P. loliácea*).—Panicle racemose, rigid, usually one-sided, very rarely branched; spikelets narrow and oblong, 8—12-flowered; glumes blunt, nearly equal. Annual. This grass is much like *P. rigida*, equally stiff and wiry, and of about the same height. The spikelets are mostly arranged down the main stem on alternate, short, stout, foot-stalks, more or less distant, each stalk bearing one spikelet, and all turning one way. It flowers in June, and grows on sandy soils and on rocks, but is not, like the last species, a common plant. Its stem is stout and slightly curved. Also known as *Festuca loliacea.*

9. **Flat-stemmed Meadow-grass** (*P. compréssa*).—Panicle rather one-sided and close, but spreading when in flower; spikelets oblong or somewhat egg-shaped, 5—7-flowered; rootstock creeping, with long runners. Perennial. There are two varieties of this grass; one having three silky nerves on the flowering glume, and its flowers connected by a web; and another in which the nerves are five in number, and the flowers free. This Meadow-grass is readily distinguished by its flat stem, which bends at the base, is rather stout, and usually more than a foot high. The panicle, which opens in June and July, is little branched, of a sea-green tint, often more or less tinged with purple; the leaves grow early in spring, but are not numerous; they are short, narrow, and tapering to a point. In the variety in which the flowering glume is 5-nerved, the stem is flattened and has many knots, and the branches of the panicle are short. This grass is frequent on dry, stony places, and on the top of walls in Britain, but is rare in Ireland.

10. **Smooth-stalked Meadow-grass** (*P. praténsis*).—Panicle loose and spreading; spikelets oblong, of about four flowers; stem smooth, upper sheath much longer than its leaf; rootstock creeping, with runners. Perennial. This species is in early spring one of our greenest grasses, and to it

we owe much of the beauty of the meadow-lands, where it forms a valuable pasture plant. Either this grass or the Meadow Foxtail, when growing in abundance, indicates that the land is naturally good, or that it has been well drained; but one of the recommendations of this species is that it may be cultivated on almost any soil. Though the plant varies in different situations, yet its leaves are mostly broad, and its smooth stems of good size. Even their bending at the base is serviceable, by preserving the matted form of the turf, so useful in pasture-lands; and the Smooth-stalked Meadow-grass is one of those commonly called by the farmer "sweet-grasses," being very nutritive. A good grass-field often has this, the perennial Rye-grass, one or two species of Fescue, the Cock's-foot, and that form of the Marsh Bent which sends out long runners; and these and some other good grasses will, if the land be in good condition, soon take possession of the soil; while inferior grasses and such as are fitted only for poor lands will gradually disappear. Some grass, however, which is natural to the meadow, will probably for some time assert its right, and come up even under the improved condition of the land, but it dwindles away in the course of a few seasons. This species and the next are often used by gardeners for lawns. It flowers in June and July, and its panicle varies much in size.

11. **Roughish Meadow-grass** (*P. triviális*).—Panicle loose, erect; spikelets of 2—3 flowers, connected with a web; upper sheath rather rough and much longer than its leaf; stem roughish; rootstock creeping, but without runners. Perennial. This is a slender grass, with a stem one or two feet high. It is a more graceful plant than the last, though much like it, and its spikelets are smaller. It is very common in meadows and pastures, and is considered by Curtis to be one of our best grasses for moist soils and sheltered situations; and though its herbage is rather less nutritious than that of the last species, yet it is very plentiful. The plant grows naturally in moist shady places, and is well adapted for grass-plats in towns, where the smoke and confined air are so unfavourable to vegetation that no grass save this and the Annual Meadow-grass will contribute to the greenness of the little spot on which the eye of the dweller in cities is so glad to repose. The green panicle is much branched, and flowers at midsummer; the leaves are taper-pointed.

12. **Bulbous Meadow-grass** (*P. bulbósa*).—Panicle close, erect; spikelets egg-shaped, with four flowers, which are silky at the keel and connected by a web. Perennial. This is a very distinct species, having a white serrated edge to its leaves, and a stem which swells at the base, so as to resemble a bulb. It is an early grass, growing chiefly on the sandy sea-shore, bearing its spike-like cluster on a stem about a foot high, and flowering in April. It has scarcely expanded before it begins to wither away, and its bulb-like knots lie drifting about on the sands all summer and autumn till they finally fix themselves into the soil. It is found chiefly on the eastern and southern shores of England.

13. **Alpine Meadow-grass** (*P. alpína*).—Panicle erect, spreading when in flower; spikelets oval, of four or five flowers; flowering glumes silky at the keel, and of a beautiful deep purplish-red, with a clear margin; perennial, fibrous, and tufted. In a variety, *glomerata*, the panicle is densely

1 BULBOUS MEADOW GRASS.
Poa bulbosa.

2 ALPINE M. G.
P. alpina.

3 WAVY M. G.
P. laxa.

4 WOOD M. G.
P. nemoralis.

5 ANNUAL M. G.
P. annua.

Pl. 267.

crowded. This grass is extremely abundant in the lofty mountains of England and Wales, and, like the greater number of grasses growing on elevated positions, is viviparous, forming buds between the stem and leaves. Its stem is from six to twelve inches high. Its panicle flowers in July and August, is somewhat drooping, the spikelets large and of a fine red colour, and the leaves are short, blunt, and tipped with a minute spine.

14. **Wavy Meadow-grass** (*P. láxa*).—Panicle loose, slightly nodding, closing up when in fruit; spikelets egg-shaped, 3 or 4 flowered; flowers either connected by a web or free; outer flowering glumes silky at the keel. This is a mountain-grass, and grows on Ben Nevis and Loch-na-gar at altitudes from 2,000 to 3,600 feet. It is slender, of a rather pale green, with a stem from six to twelve inches high, flowering in July and August, and bearing broad greenish-purple spikelets. It is often viviparous. There is a sub-species, known as *P. stricta*, distinguished by having the leaves flat to the tip (in *P. laxa* the tips are concave), and the panicle spreading when in fruit.

15. **Wood Meadow-grass** (*P. nemorális*).—Panicle loose, slender, slightly leaning to one side; spikelets egg-shaped, 2—5-flowered; flowering glumes silky at the keel. Perennial. Of this plant there are many varieties. Their characteristic differences consist in the relative size of the spikelets and the habit of the panicle. Some of the varieties are so marked and constant that many botanists have considered their characteristics as permanent, and describe them as distinct species. Such are the *P. balfourii* of Parnell, which has an erect panicle, with larger spikelets of a most beautiful blue colour, the foliage more or less glaucous; the *P. parnellii* of Babington, a mountain-grass, which grows in upper Teesdale, and which is an elegant, very slender, pale green plant, with smaller spikelets. The Wood Meadow-grass is the only species of the genus which does not grow wild on open pasture-lands. It is very common in our woods and thickets, and is a delicate, upright grass, with many leaves in early spring, flowering in July and August, and with a stem one or two feet high. It has not been much grown on open pasture lands, but it yields a fair amount of tender and delicate herbage, which cattle seem to relish in the autumn. It is a late-growing grass, and affords more herbage at that season than in the earlier part of the year.

16. **Annual Meadow-grass** (*P. ánnua*).—Panicle somewhat triangular, with spreading branches; spikelets egg-shaped, of five or six flowers, destitute of a web. This little bright-green grass, and the little flower called the shepherd's purse, are perhaps the two most common plants in the world. Not only is this grass found in every meadow of the temperate zone, but occasionally in most climates, often on mountains at a great elevation. And not alone in meadows do we see its cheerful verdure, but on almost every waste spot where a wild weed may spring;—on the bank by the roadside, among the mosses and stonecrops of the wall, on the garden path, among the stones of the beach just beyond the reach of the tide, with the reeds by the river, on the churchyard grave, and between the crevices of the town pavement where the foot of the passenger daily treads. Be the season inclement as it may, nor winds, nor sleet, nor chilling rains will exterminate it, though the frost may nip its blades. It is in flower all the spring and summer, and occasionally even in winter, and it ripens its seeds and sheds them in the

soil even before the time of weeding commences. It is less useful for hay than as green fodder. It is one of the sweetest grasses, and it is thought that during more than eight months of the year it ripens and deposits seed. This circumstance, and its growth under a lower temperature than any other grass will submit to, render it almost like a perennial on the green mead, and it is well suited for parks and lawns, with the vernal grass and white clover, as it does not turn yellow, like sheep's fescue, and some other grasses used for pleasure-grounds, but makes a beautiful and permanent verdure. Much do those who delight in the green lane or wide-spread meadow owe to this little plant. It has many fibres to its root, and they serve to fix the grass so firmly that the frost, which loosens so many plants, leaves this steadfast as ever. "It becomes," says Mr. Knapp, "a support to its needy neighbours in winter, and by its plentiful and sheltering foliage preserves a certain degree of humidity during the exhalations of summer." It is sometimes the prevailing grass on meadow land.

The stem of the Annual Meadow-grass is from six to ten inches high; its leaves are rather blunt, and somewhat soft and drooping. It is the plant to which we might refer when we use the comparison "green as grass," for its hue is always bright and never tinged with purple.

27. (29) HEATH-GRASS (*Triódia*).

Decumbent Heath-grass (*T. decúmbens*).—Panicle of a few 2—4-flowered spikelets on very short stalks, which are often undivided; glumes nearly equal, almost as long as the spikelet. Perennial. This grass is very abundant on dry pastures and heaths, especially in mountainous countries. It was formerly included in the genus Poa, but it is very unlike the plants of that family in its general appearance, and its spikelets are very much larger than those of any meadow-grass, save *P. flúitans*. The plant varies less than most grasses. Its stems are rigid, from six to twelve inches high, and bend at the base, but those which bear the flowers are upright. The leaves and sheaths are rather hairy, the former narrow and tapering to a sharp point; and the large spikelets are commonly four or five in number, and rarely exceed seven; they are arranged alternately on the upper part of the stem. The glumes are rounded on the back, firm and leathery, and of a pale green colour, quite covering the flowering glumes; and instead of a ligule to the leaf there is a tuft of hairs. This grass is of little service on the hilly pasture.

28. (38) QUAKING-GRASS (*Bríza*).

1. **Common Quaking-grass** (*B. média*).—Panicle with straggling branches; spikelets broadly egg-shaped, of about 5 flowers; empty glumes very concave, heart-shaped, and blunt, and shorter than the flowering glumes. Waving to every wind, and shaken even by the approaching footstep, this pretty quaking, or tottering, or "doddering" grass is plentiful on meadows and pastures in the month of June. Our old writers call it Pearl-grass, and some country people know it by the name of Maiden's-hair. Its botanic name, taken from the Greek verb "to vibrate," is expressive of its nicely-balanced spikelets, which hang on branches so slender as to cause a continual tremulous motion. The stem is twelve or eighteen inches high, the spikelets

1. DECUMBENT HEATH GRASS, Triodia decumbens
2. COMMON QUAKING G, Briza media
3. SMALL Q. G, B. minor
4. ROUGH COCKSFOOT G, Dactylis glomerata
5. CRESTED DOGSTAIL G, Cynosurus cristatus
6. ROUGH D. G, C. echinatus

Pl. 268.

are purplish-brown, varied with white, the leaves tapering to a sharp point. It is frequent in meadows and pastures, and among the short grass of downs, but wherever abundant it indicates a poor soil, and though a perennial, it disappears when the land is brought into better condition. It is too bitter to be a favourite fodder-grass, but cows, horses, and sheep will eat it.

2. **Small Quaking-grass** (*B. minor*).—Panicle straggling; spikelets triangular, about 7-flowered; empty glumes longer than the flowering glumes. This is an annual species, with a very slender, erect stem from 1—2 feet high, and very numerous small pale-green spikelets. It is found in dry and sandy cultivated fields in the extreme south-west of the kingdom, and flowers in July.

29. (37) Cock's-foot-grass (*Dáctylis*).

Rough Cock's-foot (*D. glomeráta*).—Panicle branched, with oval clusters, which taper to a point; spikelets small and densely crowded; glumes membranous. Perennial. This large, rough, coarse-looking grass may be seen in flower during June, a few occasional clusters lingering on even through the autumn. It is common in every meadow, by roadsides, on moist or dry land, on hill or dale, but most luxuriant among trees and bushes, and well fitted for growing in orchards, or on moist shady spots. The erect, round, rough stem is from 1—3, or even 4 feet high, the upper part usually bearing its tufts on spreading straggling branches; but sometimes these are wanting, and the panicle consists of one tuft, usually tapering towards the summit, and often tinged with a delicate or more deep lilac tint. The leaves, which are long, flat, and narrowing to a point, are hard, rough on both sides, and of a rather dark bluish-green. This grass yields a very large amount of herbage, which has been found, both by chemical test and experience, to be highly nutritive and much liked by cattle, except when its leaves are very large and coarse. As it shoots up rapidly and plentifully, and produces a good aftermath, it is a valuable grass; but, owing to the coarseness of its stems, it has not been so well liked for hay by our farmers. Professor Buckman remarks of it: "That it is capable of giving a large crop, my experiments fully prove, not only of culms, but also of aftermath; the culms, however, are somewhat coarse, but with their nutritive qualities must be valuable, especially in chaff. I am not aware of its having been tried as a self-crop; but there can be no doubt that, if examples be tried different from those generally employed, this grass has much to recommend it." It has been found to succeed when in combination with the rough meadow-grass, the hard variety of the sheep's fescue (*duriúscula*), the meadow fescue, and the ray-grass, the far greater proportion being the Cock's-foot. It will thrive even during drought.

30. (32) Dog's-tail-grass (*Cynosúrus*).

1. **Crested Dog's-tail** (*C. cristátus*).—Panicle long, narrow, one-sided and spike-like; flowering glumes with a very short awn. Perennial. This grass is, during June and July, easily distinguished by the involucre at the base of each of its spikelets, consisting of segments scarcely thicker than threads, and very rigid. The spikelets are on short stalks, and are arranged

alternately on the wavy upper part of the stem. Each spikelet has from 2—5 flowers, the outer flowering glume ending with a very short awn. The slender stem is from half a foot to a foot and a half high, and the leaves are flat, tapering to a point, smooth and shining on the under surface, but rough above. It is a very common grass on dry pastures; and its crested spike may, in August, after the young leaves have been cropped or withered, be seen standing up in numbers, so as to give a brown tint to the sward. It is a grass well fitted by the slender nature of its foliage for lawns and pleasure-grounds, which are often subjected to the scythe, and where it would not remain long enough untouched to assume this brown hue.

The fine, uniform, and strong stems of this Dog's-tail-grass have been used in plaiting straw for bonnets, and several other of our native grasses have been found useful for this purpose. Cobbett, who made many experiments on this subject, considered that the straw of our wild yellow oat (*Avéna flavéscens*) was better fitted than any other native species for this purpose; he recommended also the vernal-grass, rye-grass, and the dog's-tail grass as well worth attention; and others have tried with success the mat-grass (*Nárdus stricta*), and the sheep's fescue, as well as some species of bent (*Agróstis*). In has been thought by good botanists that these grasses might be extensively used for plaiting-straw instead of the wheat-straw now commonly used for bonnets. The wheat which furnishes this straw is chiefly grown on light soils of Bedfordshire and Hertfordshire. The straw used in the Tuscan bonnets is obtained from a species of wheat sown on poor soils, that it may produce long slender stems; and the Leghorn hats are made of the same straw differently worked.

2. **Rough Dog's-tail-grass** (*C. echinátus*). — Raceme compact, egg-shaped, with awns as long as the flowering glumes. Annual. This is a very rare grass, found on sandy sea-shores in the Channel Islands, from which it appears to have been introduced to the English coasts. Its stem is slender, one or two feet high, the leaves flat, tapering to a sharp point, and rough on both sides. The author has a specimen gathered near Manchester, which is more than three feet in height, with its greyish-green bristly cluster an inch and a half long, but this is unusually large. The spikelets are small, and crowded on short stalks, all turning one way, and the fine divisions of the involucre at the base are very rough. This grass flowers in July.

31. (41) Fescue-grass (*Festúca*).

1. **Single-glumed Fescue** (*F. uniglúmis*).—Raceme in two rows, turning one way; lower empty glume very minute; flowering glume shorter than their awns. Annual. This is a very local grass, known from the other species of Fescue by having apparently one glume, the other being scarcely perceptible. The stem is from half a foot to a foot high, and very leafy. The flowers have 2 or 3 stamens; it grows on sandy sea-shores, and flowers in June.

2. **Barren Fescue** (*F. bromoides*).—Panicle turning one way; glumes very unequal, their awns rough. Annual. In one variety of this grass the flowering panicle is erect and spreading; in another the panicle droops at the end, and is long, narrow, and spike-like. The latter form, *myuros*, is

1 SINGLE GLUMED FESCUE GRASS,
Festuca uniglumis.

2 BARREN F.G.
F. bromoides

3 SHEEPS F.G.
F. ovina

4 REED F.G.
F. sylvatica.

5 MEADOW F.G.
F. pratensis.

6 TALL F.G.
F. elatior.

7 TALL BEARDED F.G.
F. gigantea

commonly called Capon's-tail-grass. The Barren Fescue varies very much. Its height is from six to twelve inches, and its stem is more or less leafy; it grows on dry pastures and walls. In its ordinary form its spikelets are something like those of the barren brome-grass, but erect and much smaller. The leaves are long and slender, like bristles. It flowers in June; its florets have but one stamen, and in the form *myuros* the panicle is sometimes half a foot long. Hooker *fils* regards *F. myuros* as the type, and *bromoides* he classes as a sub-species under the name of *F. sciuroides*. The latter is widely distributed throughout Britain, but *F. myuros* has been recorded only from the Isle of Wight, Dorset, Norfolk and Suffolk.

3. **Sheep's Fescue-grass** (*F. ovina*).—Panicle close, somewhat turning one way; spikelets usually with awns half their length; leaves all bristle-like. Perennial. This is a most variable grass, and consequently one which is exceedingly puzzling to a young botanist. In one form, *vivipara*, a grass about half a foot high, the spikelet is converted into a leafy shoot, and the grass is, in appearance, most unlike its ordinary condition; in another, *tenuifolia*, the leaves are much longer than usual; in *rubra* the rootstock frequently sends out runners, the suckers terminating in erect shoots; but this mark does not appear, from Professor Buckman's experiments, to be constant, for, though occurring on sand deposits, the root does not creep in clays; it yields a quantity of fine herbage, but grows in separate tufts, and does not, this botanist says, present any inclination to form matted turf. A well-marked variety, and one which is very unlike the ordinary form of Sheep's Fescue, is that termed *duriuscula*, or Hard Fescue, which is common on dry hilly pastures, often growing to the height of two feet, with a large pyramidal panicle with straggling branches, and long and somewhat broader leaves than most forms. The Sheep's Fescue-grass received its specific name from Linnæus, because so much relished by sheep, and he thought that these animals cared little for pastures in which it did not exist. It is too small a grass in its usual form to be very productive, but it grows abundantly on dry elevated heaths and downs, forming a large portion of the grass and fine turf of many a hill-side. It affords a most pleasant and nutritive food to all kinds of herbivorous animals; and Gmelin says that the Tartars choose to fix, during the summer, in those places where there is the greatest plenty of this grass, because of its worth to their flocks and herds. The leaves are very numerous, more or less curved, apt to turn yellow in autumn, and sometimes becoming, on hills near the sea, of a bright orange tint. It is abundant on almost all our chalky downs, and its height is from three to nine inches. The latter variety, *duriuscula*, is usually more or less of a sea-green tint, and its panicle often purplish. This, and the common form, make excellent grasses for lawns, on account of their fine herbage; and they do not often require mowing. The larger form is an early grass, and will thrive on almost any soil, though growing naturally mostly on those which are sandy; and it resists drought in summer, and retains its verdure remarkably in winter. It is a most useful grass. Hooker regards the forms *duriuscula* and *rubra* as sufficiently distinct to be styled sub-species.

4. **Reed Fescue** (*F. sylvática*).—Panicle erect, much branched; spikelets rough; glumes very unequal; leaves narrowly lance-shaped, rough at

the edges; rootstock with short runners. Perennial. This is not infrequent in mountainous woods; its stem is from 2—4 feet high, and has at its base a number of brownish scales. The leaves are long, and of somewhat yellowish-green. It flowers in July. It is an early grass, but one not much relished by cattle. There is a small variety, *decidua*, with narrow leaves.

5. **Meadow Fescue** (*F. praténsis*).—Panicle always close; branches in pairs, one bearing a single spikelet, the other one or more spikelets, sometimes wanting; spikelets 5—10-flowered; flowering glumes scarcely awned. Perennial. In one variety of this grass some or all of the branches of the panicle are in pairs, one usually having several spikelets. In another, which is often described as a distinct species or hybrid (*F. loliácea*), the spikelets are arranged alternately on the stem in a spiked form, either without stalks or with very short stalks. This form is very much like the floating meadow-grass in appearance, and it is a grass much valued by owners of grass lands. The Meadow Fescue is from a foot to a foot and a half high, the leaves flat and rough, the upper spikelets on branches springing immediately from the stem. It is a very common plant, often forming a large portion of our meadow-grass near rivers or streams, the variety *loliácea* being less frequent. Though rather a coarse grass, yet the Meadow Fescue is, when young, much relished by cattle and sheep, and affords excellent hay. On some soils it becomes exceedingly large and coarse, and hence less serviceable.

6. **Tall Fescue-grass** (*F. elátior*).—Panicle loose, spreading, with many branches, which are mostly in pairs, each bearing 2 or more spikelets, and straggling after flowering; spikelets very numerous, and shortly awned. Perennial. This grass differs from the preceding in appearance, yet many botanists consider it not as a distinct species, but a variety or sub-species of it. The genus *Fescue* was once believed to contain many more species than now, as experience has proved that some plants considered distinct gradually run into one type under culture and on different soils. This is not an infrequent plant in wet meadows, flowering in June and July, and growing in large coarse tufts. It differs from the *F. pratensis* by its much-branched spreading panicle. The upper spikelets are on short stalks proceeding from the stem, the lower ones on simple or divided branchlets, the cluster being large, and having a full and branched appearance. The leaves are flat, tapering to a point, rough within, and smooth on the outside. The branches of the panicle are rough, and the panicle often bends to one side. It is a very productive grass, and its herbage, though coarse, is nutritious. Dr. Calvert says it is ravenously preferred to all other grasses by cattle and horses.

7. **Tall Bearded Fescue** (*F. gigantéa*).—Panicle branched, drooping towards one side; spikelets 3—6-flowered; glumes very unequal, awn very long, inserted a little below the point of the flowering glume. Perennial. In a form found in Norfolk the panicle is larger and more drooping; in another the panicle is smaller and erect, the leaves are narrower, and the spikelets about 3-flowered. This grass when fully grown may be distinguished by its large size, for it is one of the very tallest of our grasses, and one which is common in shady woods and moist hedges. In the latter places it often even overtops the shrubs; for when shade and moisture combine, its

1 UPRIGHT BROME GRASS.
Bromus erectus

2 HAIRY WOOD B. G.
B. asper

3 UPRIGHT ANNUAL B. G.
B. diandrus

stem will sometimes rise to the height of 6 feet, while in drier places it is not more than half as high. Its stem is leafy, and the upper sheath is larger than the leaf. The leaves are broad, flat and rough on both sides, and of a deep green colour; but the panicle is pale green. This is large and loose, much like the brome-grasses, especially the hairy wood brome-grass, but with smaller spikelets and of a brighter green colour: the abundant foliage is eaten by cattle; but this is not one of the most nutritious grasses. It flowers in July and August.

32. (42) Brome-grass (*Brómus*).

1. **Upright Brome-grass** (*B. eréctus*). — Panicle erect without branches; spikelets narrow, lance-shaped, erect; flowers distant from each other, about twice as long as the straight awn. In one form the spikelets are smooth and shiny, in another they are downy. Perennial. This is not a common grass, but grows on dry sandy or chalky soils, in fields and by road-sides. The stem is commonly smooth and round, and 2 or 3 feet high; the root leaves are narrow, and the upper leaf always much broader than the others. The erect panicle expands in June and July, and is remarkable in the early part of its growth for the purplish colour of the spikelets and their awns. The grass is frequent on the dry stony hills of Somersetshire, Gloucestershire, and Wiltshire, where it attains unusual luxuriance, and its ordinary height is 2 or 3 feet. In its wild state it is one of the most common Grasses of the Cotswolds, where it descends also into the vale. It is a harsh plant, and has long been known to be rejected by cattle. Professor Buckman remarks: "Its agricultural value is practically demonstrated by the disinclination of cattle to eat it, and the very poor hay it makes; and it is interesting to find that in the analysis of twenty species of our commonest meadow grasses by Professor Way, this grass in the dry state stands the seventeenth in its amount of albuminous or flesh-forming principles, being nearly at the bottom of the list, or among the last in point of value."

2. **Hairy Wood Brome-grass** (*B. ásper*).—Panicle drooping, with long, little divided branches; flowers remote, hairy; awn straight, shorter than the larger glume. Annual. This is one of the commonest species of the genus; and its slightly rough stem, which is 3 to 6 feet high, bears in June and July an elegant nodding panicle of spikelets, which are sometimes an inch long, of a greyish-green hue, and rough branches. The root leaves are very broad, much more so than those on the stem, silvery hairs are scattered over them, and they are rough to the touch. This grass grows in moist woods and hedges, but is of no agricultural value, being so harsh and coarse that cattle rarely eat it.

3. **Barren Brome-grass** (*B. stérilis*).—Panicle drooping, with long, little divided branches; spikelets very long; flowers distant from each other, shorter than the straight awn; outer flowering glume very distinctly 7-ribbed. Annual. In the month of July this tall and handsome grass hangs its cluster of large narrow long-awned spikelets, each on a long slender branchlet, in many a hedge, or on waste ground, or road-side. In the early period of their growth they are pale green, sometimes delicately tinted with purple; they afterwards become dull greyish-green or occasionally dingy

brown, and their awns are at all times very conspicuous. The stem of this grass is 1 or 2 feet high, faintly marked with lines; the leaves broad, flat, tapering to a point, and downy. It is one of our commonest grasses, and one which often mingles among the clustered grasses in the winter bouquet. It flowers in June. Cattle never eat it.

4. **Upright Annual Brome-grass** (*B. diándrus*).—Panicle erect, with scarcely divided branches; the long narrow spikelets mostly on short stalks, rising directly from the stem; flowers erect, about as long as the straight awn. In one form (var. *rigidus*), having a compact panicle, the stem, branches, and glumes are downy; in another (var. *curtisii*), the stem is smooth, except at the upper part, and the branches are rough. This is an annual grass, rare, and of little or no service to the agriculturist. It is found on sandy barren spots, chiefly in the south of England, grows below St. Vincent's Rocks near Bristol, in the Channel Islands, and at Tipperary. The round smooth stem is about a foot high, the panicle smaller than in the last species, and always upright; the spikelets are large and often of a purplish hue, and the somewhat hairy leaves are long and taper to a point. Its flowers have usually 2 stamens. Also known as *Bromus madritensis.*

5. **Great Brome-grass** (*B. máximus*).—Panicle loose, upright at first, but finally drooping, the branches little divided and becoming longer after flowering; spikelets downy; flowers distant from each other, and about half the length of the straight awn; flowering glume about half as long as its awn. Annual. This handsome grass is remarkable for its long awns. It is 1 or 2 feet high, the leaves downy on both sides. It flowers in June and July on sandy places in the Channel Islands.

6. **Smooth Rye Brome-grass** (*B. secalínus*).—Panicle loose, its branches little divided; spikelets large, oblong, flat; awn straight, about as long as the glume; the edges of the flowering glumes not overlapping those of the glumes above them. This is a conspicuous plant when, in June and July, its panicle, 3 or 4 inches long, and composed of large flat spikelets, on very slender branches, stands on a stem 2 or 3 feet high. The branches of the panicle are hairy, and the yellowish-green spikelets polished. The leaves too are hairy, especially so on the upper surface; and as the grass ripens, the florets become distinct and the spikelets droop. The seeds are said to impart a bitterness to flour if accidentally mingled with wheat, and the large size of the grass renders it a very troublesome plant in the rye or wheat field, where it is not unfrequent. It is considered a doubtful native.

7. **Tumid Field Brome-grass** (*B. commutátus*).—Panicle loose, slightly drooping, the branches divided; the simple flower-stalks as long as or longer than the oblong spikelets; glumes overlapping each other, but not closely about as long as the straight awn; sheaths hairy. This is a common grass its herbage growing very early in the year, and its flowers expanding in June and July, by road-sides and in corn-fields. The spikelets are long and glossy not so broad as those of the last species, often tinged with purple, and the stem is sometimes three feet high, and rough, as are also the branches of the panicle and the leaves. Sir W. J. Hooker remarks in his British Flora "'This species,' says Mr. H. Watson, who has studied the British Brome grasses with great attention, 'is known by its glossy grey-green spikelet

1. BARREN BROME GRASS.
Bromus sterilis.

2. GREAT B. G.
B. maximus.

3. SMOOTH RYE B. G.
B. secalinus.

4. TUMID FIELD B. G.
B. commutatus.

5. SOFT B. G.
B. mollis.

Pl. 271.

acquiring a brownish tinge in sunny spots, its longer and harsher peduncles (foot-stalks) than those of *B. móllis*, and *racemósus*, and its flowering glumes larger and more inflated than in *B. secalínus*, and *arvénsis*.'" This is a nutritive grass, useful in the spring.

8. **Soft Brome-grass** (*B. móllis*).—Panicle erect, close; spikelets egg-shaped, somewhat flattened, downy; glumes overlapping each other closely, and about as long as the straight awn. In one form the panicle is unbranched, the spikelets are on very short stalks, and, as well as the leaves, thickly covered with down. This is among our most common grasses, growing in almost every meadow, as well as on the sunny banks of our road-sides, and in field borders. It has an erect downy stem a foot or a foot and a half high, and its leaves and sheaths are hairy. It flowers in May and June. The spikelets are large, but smaller than those of the last two species, and are of a very beautiful bright, but not deep green, the chaffy edges of their flowering glumes showing so plainly that they look as if variegated with white and green. Both empty and flowering glumes are somewhat downy, and this feature distinguishes the plant from *B. racemósus*, in which these parts, instead of being soft to the touch, are rather rough. The panicle is two or three inches long. The very downy variety is found on sandy ground in Cornwall; it is of a less bright green colour than the ordinary form. The farmer includes the Soft Brome-grass with the Barren species among his worthless grasses.

9. **Smooth Brome-grass** (*B. racemósus*).—Panicle close, long and upright, usually with each spikelet on a short stalk, but sometimes with slightly divided branches; spikelets egg-shaped, slightly flattened, overlapping each other; awn straight, about as long as the glume. This appears to differ from the last species chiefly in being smooth instead of downy. It grows commonly in meadows and pasture lands; flowering in June and July, and its shining spikelets are usually of a lighter green than those of the last species. Its erect round stem is a foot and a half or two feet high. Its herbage shoots early in the spring; but it is not a valuable grass, and grows chiefly on poor soils.

10. **Taper Field Brome-grass** (*B. arvénsis*).—Panicle upright, spreading, branched; the partial flower-stalks longer than the narrow flattened spikelets; flowering glume shorter than the straight awn; anthers remarkably long and narrow. In this plant the glumes usually acquire a purple tinge, and the flower-stalks are longer than in the preceding species. It is a naturalized grass, flowering in July and August, and is a lighter, prettier, and more graceful species than the last, with spikelets much smaller than those of most Brome-grasses.

11. **Spreading Brome-grass** (*B. pátulus*).—Panicle erect, spreading loose, drooping in fruit, the lower stalks much lengthened, and either simple or branched; spikelets lance-shaped, flattened; glumes rather shorter than the nearly straight awn. Annual. This grass, which is nearly allied to the preceding, is not native. It has been accidentally introduced with ballast or foreign grain, and occurs only casually.

12. **Corn Brome-grass** (*B. squarrósus*).—Panicle drooping; branches undivided; spikelets oblong, somewhat flattened; glumes overlapping each

other, nearly smooth; awn straggling. Annual. This grass appears to be of similar origin to the last species, and its seed probably came mingled with foreign corn. The spreading awns form a characteristic distinction of the species.

33. (26) Oat (*Avéna*).

1. **Wild Oat** (*A. fátua*).—Panicle large and spreading, its branches rough; spikelets drooping; empty glumes large, keeled, and taper-pointed; flowering glumes 2—3, much awned, smaller than the empty glumes, with a number of long, stiff, yellowish hairs attached to the base of the outer glume. Annual. Several Oat-grasses intrude themselves into the corn-fields, and this is a very common weed there in June, July, and August, rising to the height of three feet. Its flat bright green leaves are marked with fine lines, and the long twisted awn of the flowering glume serves as an excellent hygrometer, being affected by the smallest change in the atmosphere. This grass is so like the cultivated oat, *A. sativa*, that some think it is but a variety of that plant, from which it is distinguished by its longer awns, and by the stiff hairs at the base of the glume. Professor Buckman, however, remarks that it is approached in the latter respect by occasional starved or seeded specimens of the field oat, in which the hairs occur. "This circumstance," he observes, "gives some countenance to the belief so general among the farmers of the heavy lias clays in the vale of Gloucester, namely, that it is unsafe for them to cultivate oats because they leave behind a degenerated race of wild oats." At any rate it is a troublesome weed, especially in stiff sterile lands. It is common in fields of this kind, either of wheat, barley, or oats, as well as among beans; and its blades being in its early growth so like those of corn, it cannot in the corn-field be distinguished, and is therefore left behind, after hoeing. Farmers have long known that the seeds of the wild oat lie a long time uninjured in the soil; and so large is the plant, that it occupies a considerable space on valuable lands, and helps to keep off sun and air from the corn, ripening too before the wheat, and shedding its grain before that is removed from the land. It is a handsome grass with its large cluster of pale green spikelets, their chaffy glumes striped with green lines, and nodding on their slender branches, though the main stem of the grass and of its cluster are erect.

The Oat was very early cultivated in this country; its name is a Saxon one, and evidently connected with the verb "to eat," the grain having been used as a bread corn as well as for horses. In very old books it is called Haver or Hafer corn; our old herbalists called it Ote, Ete, or Haver; and several European countries have a very similar name for the plant. The officer of the household, who in ancient times had to supply provender for the horses, "horssemete," as it was called, was also termed an Avenar or Avenere, from the Latin name of this grass. In Wales the Oat is still called Hever. This elegant grass is the cognizance of the Duke of Montrose, though it is not believed to be indigenous in Scotland.

2. **Bristle-pointed Oat** (*A. strigósa*).—Panicle erect, the branches all turning to one side; flowering glumes awned, two in each spikelet, each as long as the glumes, and terminated by two long, straight bristles. Annual.

1. SMOOTH BROME GRASS.
   Bromus racemosus
2. TAPER FIELD B.G.
   B. arvensis
3. SPREADING B.G.
   B. patulus
4. CORN B.G.
   B. squarrosus.

Pl. 272.

This species is not indigenous, but is found occasionally in corn-fields, where

> "The bristly barley's purple bloom
> Waves in the gale its egret plume,
> Waves in the gale as lightly float
> The pendants of the bearded Oat."

It is much like the Oat, among which it often grows; but its upright panicle, and the long straight bristles at the end of the florets, form a distinction both from that plant and the last species. Its stem is two or three feet high, round and smooth, the leaves are rather broad and rough, the spikelets large and oval, their glumes marked with green lines. It flowers in June and July.

3. **Narrow-leaved Perennial Oat** (*A. praténsis*).—Panicle erect, loose, its branches either simple or little divided; spikelets oblong, erect, of 3—6 flowers, longer than the glumes. Perennial. In this plant the lower leaves are rolled inwards, and their sheaths nearly smooth; but in the variety *alpína* the lower leaves are short and flat, and the sheaths somewhat rough. This is not a meadow grass of the low-lands, though found on some dry pastures, chiefly in mountainous regions, and it often grows in the crevices of rocks, and sometimes on dry open heaths. The stem is one or two feet high, smooth and glossy, the leaves shining, but more or less rough to the touch. The spikelets are tinged with brown, and their twisted awns are often nearly twice as long as the glumes; cattle sometimes eat its foliage. It flowers in June and July.

4. **Flat-stemmed Oat** (*A. planicúlmis*).—Panicle erect, with many rigid short branches; spikelets erect, 5—7-flowered, narrow, oblong; florets much longer than the glumes. Perennial. This grass has broad leaves, tapering suddenly to a point, with very fine serratures at the edges, and flat-keeled leaf sheaths, the lower part so flat as to become two-edged. It flowers in July. It was reported by Mr. Stuart Murray, in 1826, as growing in the Isle of Arran, in Scotland, but though Sir W. J. Hooker remarked that it had ever since been cultivated in the Botanic Gardens of Glasgow, its occurrence in a wild state in these islands has never been confirmed.

5. **Downy Oat** (*A. pubéscens*).—Panicle erect, almost without branches; spikelets erect, 2-flowered. Perennial. This is a pretty grass in June and July, when it is in flower in dry pastures. Its spikelets are much smaller than those of the last species, and in the sunshine they glisten as if cut out of silver and tinged with purple, in a slender cluster three or four inches long, their hue differing from that of any other wild oat-grass. The plant is not infrequent in chalk or limestone districts. The stem is one or two feet high, and the upper leaf has a remarkably long sheath. The leaves are somewhat broad, flat, flaccid, and downy on both sides. The long awns, which are of purplish colour, twist and often cross each other.

6. **Yellow Oat** (*A. flavéscens*).—Panicle much branched; glumes very unequal; spikelets usually 2-flowered; somewhat creeping, and perennial. This is among the commonest of the Oat-grasses, and may be seen in July, on dry sandy or stony meadows, where it is conspicuous by its cluster of glossy yellow flowers, which is often four inches long. The stem is about a foot high, and the hairy leaves are of a light green hue. The shining spikelets

are much smaller than those of any other species, and much more numerous, and they are peculiar too for their unequal glumes. By the end of July the yellow colour of the cluster changes to a dull brown hue. The plant is not very leafy, but the foliage is relished by cattle. It is the stem of this plant which Mr. Cobbett thinks superior to any native grass for straw plait; it has very few knots. Some botanists separate it from the other Oat-grasses and know it as *Trisetum flavescens.*

34. (30) Reed (*Phragmites*).

Common Reed (*P. communis*).—Panicle large, loose; spikelets 3—6-flowered, longer than the very unequal empty glumes; flowering glumes enveloped in long silky hairs attached to the rachilla. Perennial. All who have lingered at midsummer by country streams, listening to their music as the waters rustled the sedges or rippled softly over the stones, have observed this tall purplish-brown grass, like a waving plume, growing in thick masses, and five or six feet high. In its early growth the cluster is close and of a deep rich purplish-brown; then the tint becomes lighter, and the plume, at that time a foot or more long, droops gracefully on one side. A little later the numerous spikelets seem to have turned to pale grey, by the growth of the long silky hairs which surround the florets, and they are thenceforward a mass of down. One may see far away on the landscape this tall reed, fringing many a river, and forming there a miniature grove. Its smooth leaves, about a foot long, are ribbed, rough on the edges, and of a bright green colour. Patches of immense extent are formed by this plant in the eastern part of England, and called there Reed-ronds. Great use is made of the stems in thatching cottages and barns, for they make the very best of thatch, and the practice of so using them seems very old, as we find Tusser, in his poem, directing the husbandman to the timely care of his roof:—

> "Where houses be reeded,
> Now pare off the moss, and go beat in the Reed."

The long stems serve also for cottage ceilings, for screens, and other household purposes; while these, as well as the long creeping roots, are turned to good account in forming embankments near the river. In Sweden the panicle is used by country people to dye woollen cloth of a rich green. Our own villagers sometimes make a pickle of the young shoots, which they cut off from the root; and in early days the long stems were used not only for arrows, but also instead of quills for writing. This elegant plant is not merely an ornament to the margin of the waters. In many low lands of Huntingdonshire, Cambridgeshire, and Lincolnshire, it constitutes the crop of the moist soil, and in its proper season is duly harvested, and even taken for sale into neighbouring counties for the various uses to which it may be applied. An immense number of aquatic birds find their home among these reeds; and the ornithologist sometimes finds sheltered there the rare bearded titmouse, with many of the more common birds; while the sedge-warbler hangs her nest on the tall reed, and swings in her safe cradle to the rocking winds. So much injury is done by some birds to the reed crops that the farmers of these districts are compelled, during autumn, to be at much

1. WILD OAT GRASS.
Avena fatua.

2. BRISTLE POINTED O.G.
A. strigosa.

3. NARROW LEAVED PERENNIAL O.G.
A. pratensis

trouble to scare them from their haunts. Mr. Knapp remarks: "As evening advances, one sees crowds of starlings approaching from every quarter in numbers that exceed belief, to pass the night among the reeds, upon which, after various arrangements, they alight in myriads, bearing down by their weight this flexible plant into the water, and one sees large patches lodged, and beaten flat, and spoiled." Men go out in boats to shoot them, and kill hundreds night after night, yet these bold birds still come to the reed-ronds; and as the fox lurks there to seize them, he also tramples down a large number of the reeds.

Many of the reed-crops are now altogether destroyed by the improvement of the land by drainage, and millions of their waving plumes have disappeared before the railroads, and other inventions of recent times. Now and then, as we read in some old book, we are reminded how much more abundant these and other aquatic plants must have been in the earlier ages of England. In the Anglo-Saxon version of the "Life of Guthlac, Hermit of Crowland," a MS. in the Cottonian Library, apparently written before A.D. 749, we find continual allusion to these reeds, and see how the fens, with their plants, overspread land from which they have now been expelled to make way for houses and fields of waving corn. "There is, in Britain," says the old writer, Felix of Crowland, "a fen of immense size, which begins from the river Granta, not far from the city of Grantchester. There are immense marshes, now a black pool of water, now foul running streams, and also many islands, reeds, and thickets; and with manifold windings, wide and long, it continues up to the North Sea." No wonder that Crowland, which was in the midst of this wilderness, was described as a place of "manifold horrors and of loneliness, so that no man could endure it;" and no wonder that the hermit who went to live there had his home among reeds and rushes, or that some of the incidents recorded by his chroniclers occurred in the "mere, amidst the bed of reeds."

The reed-grass is commonly called windle-straw by country people:—

> "And the windle-straw so limber and grey,
> Did shiver beneath the tread
> Of the coursers' feet."

In Cornwall, where it grows abundantly up the face of sea-cliffs, it is known as goss.

35. (49) Lyme-grass (*Élymus*).

1. **Upright Sea Lyme-grass** (*E. arenárius*).—Spike upright; spikelets 2—7-flowered; empty glumes two, tapering to a point, and downy; flowering glumes broader, hairy; rootstock stout, creeping and perennial. The Lyme-grass, which grows in abundance on some parts of our shores, forms in May large patches of bluish-green blades, and bears its flowers in June and July. Its spike is from 4 to 5 inches long, erect, of a sea-green colour, standing on a stem from 2 to 5 feet high; the leaves are long, broad, hard, and rigid, rolled inwards, and ending in a sharp point. Its masses often serve as a little oasis on the desert-looking sand flats, sheltering some sand flowers or green weeds, which, but for its protection and the solidity of soil

given by its long creeping roots, could not grow there; and it is one of our most serviceable plants in fixing the sands. Many parts of the coast are quite destitute of it, but on spots where it is abundant, it may be known even far away by the peculiar bluish colour of its foliage. The only grass for which it could possibly be mistaken is the *Marram* or Sea-reed, and it differs from this in having its spikelets seated closely on the main stem, whereas those of that grass are on short foot-stalks. The seeds are in Iceland ground into flour, and used for making bread, and the grass affords a great amount of saccharine matter. It is not eaten by cattle, and, valuable as it is on our shores as a sand grass, it is far more necessary to those of Holland.

2. **Pendulous Sea Lyme-grass** (*E. geniculátus*).—Spike loose, bent downwards; the part of the stem on which the spikelets are seated, winged; glumes awl-shaped, smooth, longer than the spikelet. Perennial. This plant, which was reported many years ago as growing in a salt marsh near Gravesend, is not known to grow either there or in any other part of the kingdom, though it is rendered so singular by its kneed stem as to be readily distinguished from any other grass. The spike is erect in an early stage of its growth, and the stem next bends into a horizontal position, finally turning downwards, when it withers and falls off at the joints. The leaves are rigid and rolled inward, the stem about 1 or 2 feet high, bearing in July its very long spike.

36. (48) Barley (*Hórdeum*).

1. **Lyme-grass, or Wood Barley** (*H. sylváticum*).—Spike upright, compact; empty glumes awl-shaped, not fringed, rough, awned; flowering glume with an awn twice its length; lateral spikelets with both stamens and pistils, middle ones without either. Perennial. This grass differs chiefly from the next species in having longer awns; it is common in woods and thickets in chalky soils. It does not occur in Scotland, Wales, or the eastern counties of England; in Ireland it has been found near Dublin, but doubtfully native. The leaves are flat, ribbed, acute, rough on both sides, pale green, and pliant; and the spike, which appears in June, is green and 2 or 3 inches long, on an erect smooth stem, about two feet high.

2. **Meadow Barley** (*H. praténse*).—Spike upright, compact; glumes all bristle-like and rough, not fringed; flowering glume of the middle spikelet about as long as its awn—of the lateral ones with a short awn; lateral spikelets without pistils; central flower largest, and perfect. Annual. This is a common grass in damp meadows, and has a smooth stem about a foot and a half or two feet high, with a close spike two or three inches long. It is a slender plant, the leaves narrow and rather rough. It bears in early spring a considerable quantity of foliage, but the roughness of its awns unfits it for hay or pasture grass.

3. **Wall Barley, Way Bennet** (*H. murínum*).—Spike upright, compact; glumes of the middle spikelets lance-shaped, and fringed—of the lateral ones, bristle-like and rough; middle spikelet with stamens and pistils; lateral ones with neither. Annual. Every English child knows this common grass, so like the cultivated barley of the field as to be universally called Wild Barley. It is a shorter and stouter species than the preceding, and though

1. FLAT STEMMED OAT GRASS.
Avena planiculmis.

2. DOWNY O. G.
A. pubescens.

3. YELLOW O. G.
A. flavescens.

4. COMMON REED.
Phragmites communis.

not common in Eastern Scotland, is found throughout England on walls, cottages, and by roadsides, but rarely occurring among our meadow-grasses. Though not flowering till midsummer, yet it gives early a large quantity of herbage. The stem is a foot or a foot and a half high, the spike about two inches long, and the leaves are flat and rather rough. Both this and the next plant seem to be known by the name of Squirrel-tail Grass, and though there is considerable nutriment in the foliage, yet so much do the prickly awns injure the mouths of horses, that one of the greatest recommendations to an inn in the Isle of Thanet used to be, that the hay was without any admixture of Squirrel-tail Grass. The awns of these Barley-grasses are not only long and slender, but they are also thickly set with a double row of very minute spines, so that if this plant happen to intrude itself into the pasture, it causes much irritation to the tongue and throat of an animal eating it. These prickly awns will, on the slightest friction, propel the plant rapidly along, as every country child well knows, from the common practice of putting an ear of Barley-grass into the sleeve, and allowing it to make its way from the wrist to the shoulder, which it will do in the course of a few minutes. It grows chiefly on sandy soils.

4. **Sea-side Barley** (*H. marítimum*).—Spike compact, erect; glumes rough, the inner one of the lateral spikelets half egg-shaped, the rest bristle-shaped and rough; awn of the larger glume in the middle spikelet more than twice as long as the awn of the lateral ones; middle spikelet with both stamens and pistils, lateral ones with neither. Annual. This is the smallest of the species, and scarcely ever more than half a foot high, with an erect stiff stem which is prostrate at the base and bears a small spike. It much resembles the last species, but is shorter, more rigid, and of a paler, almost sea-green colour. It is not universally distributed on our sea-coast, but is not uncommon on grassy and sandy places from Durham to Kent and Devon; it is absent from Scotland, Wales, and Ireland, but occurs in the Channel Islands. It flowers all the summer months.

37. (45) Wheat, or Wheat-grass (*Triticum*).

1. **Crested Wheat-grass** (*T. cristátum*).—Spikelets of about four crowded flowers; glumes awl-shaped, with a terminal awn. Perennial. This grass is not considered native, though it is described as found by George Don, many years since, on the coast between Arbroath and Montrose. Its spike is an inch or more long, on a stiff, slender, leafy stem, remarkably rough, and about eighteen inches high.

2. **Rushy Sea Wheat** (*T. júnceum*).—Spikelets 4—10-flowered; empty glumes blunt, many ribbed, awnless; flowering glume blunt, or tipped with a short spine. Perennial. This is a common grass on sandy sea-shores, and often conspicuous there; its close spike of distant flattened spikelets on two rows, and from six to nine inches long, is supported by a stem from twelve to eighteen inches high. It is a rigid plant, with smooth leaves rolled inward, very slightly downy on the upper surface, and pale green. The part of the stem on which the spikelets are situated readily breaks away at the joints. It is a useful grass in binding down the sands, and, like most grasses destined for that purpose, is left untouched by animals.

3. **Creeping Wheat, or Couch-grass** (*T. répens*).—Spike very long; spikelets 4—8-flowered; empty glumes lance-shaped, with or without awns; flowering glume sharply pointed, or rarely with a short awn. In one form the rachis is smooth or downy, but always with short ascending bristles on the angles; in another the rachis is quite smooth. The second form, which is found near the sea, is of a pale sea-green colour, and is distinguished by having its flowers awned, and the edges of its leaves rolled inwards. The creeping perennial rootstock of this Couch-grass is but too well known to the agriculturist, rendering this one of the most troublesome of all the weeds which he has to contend with. The plant is very abundant on many arable lands, as well as on waste places, often giving a green colour to patches of a hedge-bank in winter, when its flat, rather dark green, and somewhat rough leaves hang about the slope. Its roots are most difficult of extirpation, and will retain their vitality amid many injuries. It flowers in the summer months, and its spike occupies about a third part of its stem, which is round, erect, smooth, marked with lines, and one or two feet high. The roots or underground stems are very sweet and nutritious, cattle of all kinds being fond of their shoots, which are found to contain three times as much nourishment as the stem and leaves. They have been recommended as suitable to be used in brewing table-beer. The Couch-grass is as common in most other European countries as in ours, and abounds even in Siberia. It is known to our farmers by several familiar names, as White Couch, Twitch, Stroil, and Quickens. There are several varieties beyond those mentioned.

4. **Fibrous-rooted Wheat-grass** (*T. caninum*).—Spike very long, slightly inclining; the spikelets near together, 2—5-flowered; empty glumes lance-shaped, 3—4 ribbed, awned, as is the flowering glume. Perennial. In one variety of this grass, found on Ben Lawers, the spikelets are 4—5-flowered, the awn longer than its glume, and the leaves rough on both sides; in another the awn is very short, and the leaves quite smooth, except on the margins. This is a very common grass in woods and hedges, and is distinguished from the last by its roots, which consist of numerous downy fibres. Its round, erect, leafy stem is from two to four feet high, the leaves are flat, of a dark green colour, the spikelets being seated on the rachis in two rows, and forming a spike three or four inches long. This plant flowers in June and July, and is called Dog's-wheat, because this, and probably the other species, are eaten medicinally by these animals. All the species have, when their foliage is bruised, a strong odour unlike that of other grasses. Many botanists recognise this genus by Gærtner's name of *Agropyrum*.

38. (43) False Brome-grass (*Brachypódium*).

1. **Slender False Brome-grass** (*B. sylváticum*).—Spike drooping; spikelets nearly cylindrical, inclining one way; awns longer than their glumes. Perennial. This grass and the next have been placed by some botanists either among the Fescue, Brome, or Wheat grasses, and they seem to hold an intermediate place between the two latter. The Slender False Brome-grass is of no value to the agriculturist, as cattle seldom touch it. It grows in woods and hedges, especially in the western counties, flowering in June and July. Its stem is round and smooth, two feet high; its leaves flaccid, broad, hairy

1. UPRIGHT SEA LYME GRASS.
Elymus arenarius.
2. PENDULOUS S. L. G.
E. geniculatus.
3. WOOD BARLEY.
Hordeum sylvaticum.
4. MEADOW B.
H. pratense.
5. WALL B.
H. murinum.
6. SEA SIDE B.
H. maritimum.

Pl. 275.

on the upper side, and of a deep green colour. It is readily distinguished from the next species by its slender spikelets, as well as by its growth among bushes or trees.

2. **Heath False Brome-grass** (*B. pinnátum*).—Spike erect; spikelets nearly cylindrical, in two rows; awns shorter than the glumes; rootstock somewhat creeping. Perennial. This grass has flat, narrow, rigid, nearly smooth leaves, and in July is very elegant, especially on those chalky, upland, heathy places, where it attains great luxuriance. It is always an indicator of a poor soil, and disappears as the land is improved. It is a rare grass, growing in open places in several counties, from York to Devon and Kent. It sometimes has a double row of spikelets, and a variety with leaves rolling inwards is found near Bath. It is of no value to the agriculturist.

39. (44) Darnel, Rye-grass (*Lólium*).

1. **Common Rye-grass, Red Darnel, or Beardless Darnel** (*L. perénne*).—Spike erect, occasionally compound; spikelets 6—8-flowered; empty glume solitary, shorter than the spikelet, awnless. Perennial. This common grass of waysides and pastures, with a dark green or purplish-green spike, about a third of the length of the stem, is commonly one or two feet high. It varies, however, very much according to the soil on which it grows, being sometimes not half a foot in height, at others rising to that of three feet. Sometimes the spikelets are few and distant, at others they are very close together, and occasionally the spike becomes clustered. It flowers in June and July. Several stems grow together, and are round, smooth, rigid, with purplish joints, and the leaves are pointed, smooth, and marked with lines. The root produces leafy, barren shoots. This grass is extensively cultivated, but in many soils it loses its perennial nature, and becomes a biennial grass. It is believed to be the meadow grass which was earliest cultivated in Europe, though the period at which it was first sown is uncertain. Dr. Plot remarks of it in 1677, "They have lately sown Ray grass, *Gramen loliaceum*, to improve cold, sour, clayey, weeping ground, unfit for Saint-foin." It was sown in the Chiltern parts of Oxfordshire. It has several varieties, known to farmers as Pacey's grass, Russell's Rye, etc.

2. **Bearded Rye-grass** (*L. multiflórum*).—Spikelets many-flowered; flowering glumes lance-shaped and awned. This plant is found in some parts of England and Scotland, but only where it has been cultivated in fields. It is the well-known meadow grass, called by the farmers Italian Rye-grass, and is by Dr. Parnell considered a variety of *L. perenne*. Professor Buckman found that both in that and this plant when grown in the Botanic Garden, the annual seeding caused the old plants to periodically die out, but they, being replaced by seedlings, the first form, *L. perenne*, was tolerably well maintained from year to year; but that the *L. itálicum*, which he considers as being a variety of *L. perenne*, has a tendency to revert under such circumstances of growth to the original form. The Italian Rye-grass is a handsome plant, its long awns giving it a crested appearance at midsummer. It is paler in colour than the common perennial species; like that it varies much in height, being sometimes even three feet high, and having several erect

stems, which grow in close tufts. It was introduced into culture in this country from Italy.

3. **Annual Flax Rye-grass** (*L. linícola*).—Spikelets many-flowered, oblong or egg-shaped; outer glume longer than its awn, or awnless; tumid in fruit; root annual, without leafy shoots. This is described in the old floras as having been found in cultivated fields near Catterick Bridge, in Yorkshire, and about Hurstpierpoint, Sussex, though no authentic specimens appear to exist.

4. **Darnel** (*L. temuléntum*).—Spikelets about 6-flowered, as long as or shorter than the glume; flowering glumes awned or awnless, swollen in fruit. Annual. In one form there are long rigid awns, about as long as the flowering glume; in the other there are short awns, or none. The stem of this grass is round, rough at the upper part, erect, two or three feet high, bearing in July a spike sometimes nearly a foot long, composed of rather large spikelets arranged in two rows, on a rough stalk. The leaves are flat, acute, and rough on the upper side, and the plant would attract attention by its large size, as well as by being unlike any other of the grasses likely to be found among our corn. It cannot, however, be called altogether a common grass; for though extremely abundant in the cultivated fields of some of our counties, where it is a sad annoyance to the farmers, yet it is a local grass quite unknown in many districts.

The Darnel grows among barley, rye, or wheat, and when in the wheat-field it so resembles the corn while as yet but in blade, that the cultivator can hardly venture to eradicate the weed, lest he should despoil the crop. Our forefathers believed, that in wet summers the wheat degenerated into Darnel; and in some retired districts this notion is still entertained, as well as the equally absurd one that rye, in unfavourable seasons, turns into the brome-grass, so common in the rye-field. Hence *B. secalínus* received its specific name from *Secale*, the rye, and was long called smooth rye. So prevalent was formerly the belief in these changes, that Linnæus found it necessary to write a dissertation in order to refute these opinions. The Darnel is the only grass known, or rather suspected, to be poisonous. There seems no doubt that this plant is the *infelix lolium* of Virgil, for ancient as well as modern botanists attributed poisonous properties to it, and centuries since laws were made in China, forbidding its use in fermented liquors. If, however, poisonous, it is so only when fermented with the barley malted for beer, or when the bread in the flour of which it is mingled is eaten hot. Some of our best botanists, as well as the great chemists of modern times, like Dr. Taylor and Professor Johnston, believe that it is poisonous under these circumstances. It is remarkable, however, that neither Pfaff nor our own chemist, Professor Johnston, could, by the nicest tests of the volatile oil yielded by the seeds of Darnel, detect any noxious principle, nor any volatile alkali like the narcotic of tobacco; and some botanists believe, with Professor Lindley, that the noxious properties, thus from generation to generation believed to exist in Darnel, are either altogether imaginary, or that their effects are greatly exaggerated. The symptoms said to arise from eating these seeds are vomiting, staggering, impaired vision, and violent tremors, similar to those experienced by persons who suffer from disorders consequent

1. CRESTED WHEAT.
   Triticum cristatum
2. RUSHY SEA W.
   T. junceum
3. CREEPING W. OR COUCH GRASS.
   T. repens
4. FIBROUS ROOTED W.
   T. commune

Pl. 276.

on the continual use of intoxicating liquors; and instances might be quoted, not alone from old writers, but from recent journals, in which cases of this kind are recorded as having occurred. Mr. Lowe suggested, in a paper read to the Botanic Society of Edinburgh, when referring to the effects attributed to Darnel, that the virulence of the plant may depend on the place of its growth, varying according to locality. Circumstances of soil or climate are well known to affect the degree of poison contained by a vegetable; thus some umbelliferous plants, noxious when growing by their native streams, become wholesome by removal to the garden. Darnel reared in the botanic garden is stated by Mr. Lowe to have produced no effect, when taken in a dose of half an ounce. Much is yet to be learned of the properties of this grass, and it is not impossible that it may be seen that some admixture of a slight portion of ergot of rye, which is well known to cause most dangerous maladies, may have produced effects which have been regarded as resulting from Darnel. Similar errors have prevailed for centuries, uncontradicted by botanist or chemist, as in the case in which a disease called raphania was supposed to originate in the mingling with flour of the seeds of the wild radish, *Ráphanus raphanístrum*, which are now well known to be innocuous.

In some places the Darnel is called Sturdy or Ryle. Its oldest name seems to be Dragge or Drawke, by which it is still commonly called in Norfolk and Suffolk; and the author, on making some inquiries respecting this grass of Kentish farmers, found it generally called Drawke by them. There is good reason for believing that the plant translated "tares" in the Scripture parable of the Sower, is this grass; and in conformity with this view, the French translators of the New Testament render the original word by *ivraie*, from *ivre*, to drink. This word is believed to be the origin of the name of Rye-grass, given formerly to this species on account of its intoxicating seeds, but now used by agriculturists as the name of the well-known wholesome grasses of the genus. The Darnel is less frequent in Scotland than in England.

40. (46) HARD-GRASS (*Leptúrus*).

Sea Hard-grass (*L. filiformis*).—Spike cylindrical, slender; glumes awnless. Annual. This singular little plant, though frequent on the Irish coast, is rare on those of England and Scotland. It grows on the muddy shores of Devon and Cornwall, near Folkestone in Kent, and on the salt marshes about Dymchurch, in the last-named county; while on the muddy shores of the Avon, among the salt-water plants which grow at the foot of St. Vincent's Rocks at Clifton, it occurs in such abundance that its numerous short, firm, spreading leaves form a good portion of the verdure of many a green patch there; and the author has found it even rising up among the flag-stones of a street, leading up the hill to Clifton, and at some little distance from the shore. The grass is of a pale sea-green colour, sometimes a little tinged with purple, four or five inches high, with its spike more frequently a little curved than quite erect. It is a more singular than attractive plant, for the small spikelets are completely imbedded in little cavities in the upper part of the grass stem, and require to be looked for ere they are seen, except on some bright sunshiny day, when the eye may be

attracted by the little white or yellowish anthers which seem to hang out of the very stalk. The foliage soon turns yellow. It is a plant very likely to be overlooked, and perhaps is less rare on our shores than is generally believed. It flowers from July to September, and its smooth stem is rather leafy. The oblong seed is shut up in the little hollow of each joint of the rachis, and falls off with it.

There is a var. *incurvatus*, found on ballast heaps at Fife, with a stouter stem and a strongly curved spike.

41. (13) KNAPPIA (*Knáppia*).

Early Knappia (*K. agrostidéa*).—Spike slender, spikelets on very short rootstalks; glumes purplish; flowering glumes white, very hairy; annual. This is a minute and very rare grass, found in sandy pastures near the sea, at Anglesea; also in the Channel Islands. Several stems grow from the same root; they are from one to three inches high, erect, and slender. The leaves are smooth, short, and channelled at the base of the stem. The grass flowers in April and May, the spikelets being either green or purplish. It seems to be found more frequently on the coast of Anglesea than elsewhere. It has been gathered from the banks of the Thames in Essex, but is now extinct there. Also known as *Mibora verna*.

42. (3) CORD-GRASS (*Spartína*).

1. **Twin-spiked Cord-grass** (*S. stricta*).—Spikes two to eight, close together, sometimes solitary; glumes silky; rootstock extensively creeping, perennial. This rare and remarkably rigid little grass grows in muddy salt marshes on the south and south-east coasts of England, from Devon to Kent, and as far north as Lincolnshire; and in the Channel Islands. The stem is smooth, marked with fine lines; the leaves, tapering at the base, are jointed upon the sheath, and but little longer than the spikes. The stem is from six inches to a foot high, and the plant flowers in July.

2. **Many-spiked Cord-grass** (*S. alterniflóra*).—Spikes numerous; glumes polished. This is readily distinguished from the last species by its smooth glumes, by the rachis being continued beyond the spike, and also by its leaves, which are not jointed to the leaf-stalk, but are dilated at the base, and continuous with it. It is much taller than the last, and is an exceedingly rare plant of muddy salt marshes. It was discovered by Dr. Bromfield in 1836, at Itchen Ferry, Southampton. Sir J. D. Hooker regards it as a var. of *S. stricta*.

43. (28) DOG'S-TOOTH GRASS (*Cýnodon*).

Creeping Dog's-tooth Grass (*C. dáctylon*).—Partial spikes four or five in a crowded cluster; empty glumes smooth, flowering glumes longer than the empty ones; perennial. This rare and singular grass is found on the sandy shore between Penzance and Marazion in Cornwall, where it also grew in the days of John Ray, and it was long thought that this was the only locality for it in this kingdom. It is now known to occur also on some parts of the Devonshire coast, and at Studland in Dorsetshire, as well as in the Channel Islands. The stem is from three to six inches high, creeping

1. SLENDER FALSE BROME GRASS, Brachypodium sylvaticum
2. HEATH F. B. G., B. pinnatum
3. PERENNIAL RYE G., Lolium perenne
4. BEARDED R. G., L. multiflorum
5. ANNUAL FLAX R. G., L. linicola
6. DARNEL, L. temulentum

Pl. 277.

at the base, and smooth; the leaves rigid, tapering, and downy beneath, those on the stem mostly folded; and it bears its cluster of spreading, slender, purplish-green spikes, with their numerous spikelets, in July and August.

This grass, though so rare in this country, is abundant in some others. It is remarkable for its power of resisting drought, and flourishes on the driest sands of Egypt. Backhouse found it in great plenty in Van Diemen's Land, and remarks of it at Paramatta: "The grass lands are green from the abundance of *Cynodon dáctylon*, which not only abounds in pastures in this country, but takes the place occupied by *Poa annua* in England at the bases of walls, by the sides of footpaths, etc." We have too little of this plant in this country to regard it as of any use, nor is it considered nutritious when compared with the many valuable grasses grouped on our pasture-lands. In Hindostan, however, where there is little herbage for cattle, and where every pasture-grass becomes important, this is highly prized. Dr. Jacob, remarking in his Flora of Cornwall that this grass has been clearly ascertained to be the *Dúrvá* or *Dúb* grass of the Hindoos, quotes the observation of Sir William Jones: "Its flowers in their perfect state are among the loveliest objects of the vegetable world, and appear through a lens like minute emeralds and rubies in constant motion from the least breath of air. It is the sweetest and most nutritious grass for cattle, and its usefulness, added to its beauty, induced the Hindoos in their earliest ages to believe that it was the mansion of a beautiful nymph; even the Veda celebrates it, as in the following texts of the *A t' harvana*: 'May Dúrvá which rose from the waters of Life, which has a hundred roots and a hundred stems, efface a hundred of my sins, and prolong my existence on earth a thousand years.'" Another form of its name in India is Darbha, and Sir Wm. Jones shows that the plant is frequently referred to in Sanscrit law books as well as poetry as a sacred plant. Here is a quotation from an incantation to it contained in the fourth Veda:—

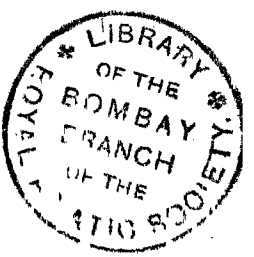
"Thee, O Darbha, the learned proclaim a Divinity not subject to age or death; thee they call the armour of India, the preserver of regions, the destroyer of enemies, a gem that gives increase to the fields; at the time when the ocean resounded, when the clouds murmured and the lightnings flashed, then was Darbha produced, pure as a drop of fine gold."

44. (1) FINGER-GRASS (*Digitária*).

1. **Hairy Finger-grass, or Cock's-foot Finger-grass** (*D. sanguinális*). —Stem creeping at the base; spikes from three to five fingered; spikelets in two rows, lower glume very small; annual. This is a rare and not truly a British grass, formerly found growing in fields at Battersea. Its stem is from six to twelve inches long, prostrate and rooting at the base, smooth and marked with fine lines. The leaves are hairy, their sheaths rough, with small tubercles. The grass is of no agricultural use; but Mr. Sinclair remarks of it, that in some parts of Germany it is cultivated for its seeds, which are boiled with milk, and form a palatable dish resembling sago. Mr. Loudon states that it is applied to a similar purpose in Poland, and

informs us that its name *sanguinalis* was suggested by a use to which the boys of Germany put it. Ever intent on mischief, they have discovered that a skilful application of its sharp spikes to the nose of another boy soon draws blood. This grass flowers in July and August; its spikes are purplish-green, but less deeply coloured than those of the next species. Also known as *Panicum sanguinale.*

2. **Smooth Finger-grass** (*D. humifúsa*).—Spikes about three or four; spikelets in pairs, one on a longer stalk than the other, and more distinctly egg-shaped than in the last; lower glume very minute or wanting; upper glume downy; annual. This, too, is an introduced plant, found rarely on fields of a loose sandy soil. Its stem is more prostrate than that of the last species, and the spikes are of a deeper purple. Its leaves and sheaths are smooth. Both species are unlike any other grass found in this country. Also known as *Panicum glabrum.*


LIBRARY OF THE BOMBAY BRANCH OF THE ROYAL ASIATIC SOCIETY

1 SEA HARD GRASS,
Lepturus filiformis

2 EARLY KNAPPIA,
Knappia agrostidea

3 TWIN SPIKED CORD GRASS,
Spartina stricta

4 MANY S. C. G.,
S alterniflora

5 CREEPING DOGS TOOTH G.,
Cynodon dactylon

6 HAIRY FINGER G.,
Digitaria sanguinalis

7 GLABROUS F. G.,
D humifusa

Pl. 278.

THE FERNS

OF

GREAT BRITAIN

CLASS III. ACOTYLEDONES.

Order CII. FILICES—FERN TRIBE.

ONE may often observe that persons who are fond of nature, and who have yet never studied Botany systematically, are desirous of commencing that study with Ferns. Their extreme elegance of form, the small number of the British species, the apparent simplicity of their structure, and the comparative ease with which they may be preserved and formed into a good collection, all tempt the learner to "begin at the beginning," and to proceed afterwards to what he would consider as the more complicated part of Botany. Yet the study of the ferns really requires more attention, and even offers more difficulties, than that of most orders of the Flowering Plants. The scientific descriptions, founded often on more minute distinctions, are less obvious; and in some few cases, even among our British ferns, it is hardly possible to decide whether a plant should be regarded as a species or a variety, while their classification cannot be considered as even yet fully settled. There are, however, few things which are worth knowing that can be known without patient attention, and we rejoice in finding this bestowed on the study of these beautiful plants. It is pleasant to see the rambler in the country searching through green lane or by dripping well for the feathery fern, or wandering over the open moor with his handful of

"Heath-bells dark, and bracken green."

It is pleasant to see the graceful sprays of these plants made the objects of care and culture, and to mark them while waving over fern banks and fern walls, which have been reared for the purpose of adapting soils and situations, light and shadow, so as would best suit the ferns taken from various wild spots. Means are thus afforded for their study to those who have leisure, while the rock garden is often, also, adorned by the fronds of some of the more hardy kinds; and some of the most rare and delicate may be found in the greenhouse, or even in the dwelling-rooms of the city, forming

55236

an ever-verdant miniature forest in the Wardian case. Even the herbarium, with its dried specimens, gives a far better idea of the usual condition of the fern than it does of flowering plants. Leaves and blossoms may, by great care, be preserved so as to retain somewhat of their elegant form, and a little of their natural beauty of colour. The poet could remember with joy the teachings of one who showed him

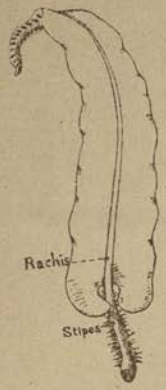
> "How to make sweet pictures of dried flowers,
> Cull'd in the lanes when glow'd the sultry hours;
> Then press'd and dyed, and all on lawn dis-spread,
> To look as infants do that smile when dead."

But the fern spread out on the page scarcely gives us even an image of death; its green is so living, its form so perfect, that we could fancy it had just been gathered in all its pride of beauty from shadowy woodland or rocky glen.

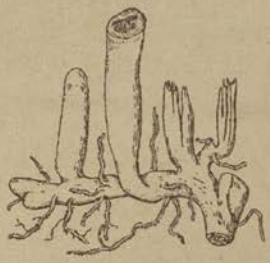
A popular description of a fern might be: "A large leaf or branch of leaves, bearing no flowers." Yet that leaf-like spray differs from a leaf in several particulars of structure; the most marked of which is, that it represents the leaf and fruit conjoined, bearing its fructification, in most cases, on its under surface. The word *frond*, therefore, applied to the green expansion of a fern, though it originated in the idea that the leaf of a fern was composed of a branch and a leaf, is not altogether an unnecessary distinction. The frond consists of two parts—the leafy portion and the stalk. The stalk is often called the *rachis*, but, strictly speaking, it is composed of two parts. That part which bears the green leaf is the rachis; and the lower portion of the stalk, destitute of the green expansion, is the *stipes*. When the frond is so divided, that, beside the principal stalk, another set of stalks runs through the green divisions, each of these last is a *secondary rachis;* the term *primary rachis* referring to the main stalk.

The lower part of the stalk, the stipes, is in some of our ferns naked; but it is more often beset with chaffy scales, usually thin, and frequently of a pale brown colour. Sometimes these are few in number, and found only at the base; but occasionally they are continued along the rachis, becoming smaller as they are higher on the stalks. The young fronds of several of the large and common ferns may be seen in May, looking very singular and beautiful on the green bank, coiled up and covered with large scales; and these scales afford, too, by their mode of growth, an assistance to the botanist in the determination of species. The true stem of the fern generally lies along the surface of the ground, or below it, and from its resemblance to a root is termed the *rhizoma*. The stems and fronds of ferns have neither true wood nor bark, but are strengthened by bundles of tubes and fibres, which are embedded in cellular structure. The harder part is external, and the centre is either hollow, or more commonly filled with a soft pulpy matter; so that the stem of a tree fern very much resembles that of a palm in this respect, as well as in the cylindrical form which it often assumes.

The green expansion of a frond differs in various families. In some it is delicate and almost transparent—a mere green film; in other cases it is tough and leathery, or thin, crisp, and brittle. Now we find it of bright grass-green, or it is of a dull olive, or of deep dark or brownish, or greyish-



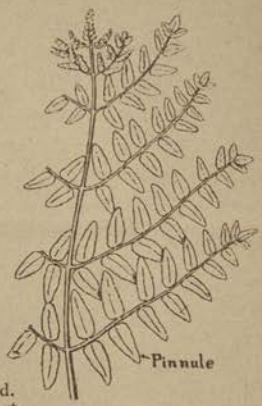
Simple Frond.
Hart's-tongue.



Rhizoma.
Bracken.

Pinnatifid Frond.
Ceterach.

Pinnate Frond.
Sea Spleenwort.



Bipinnate Frond.
Royal Fern.

Decompound Frond.
Black Spleenwort.

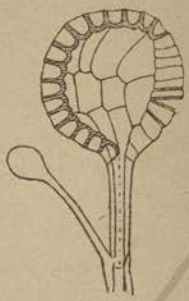
Circinnate Vernation.
Male Fern.

Straight Vernation.
Adder's-tongue.

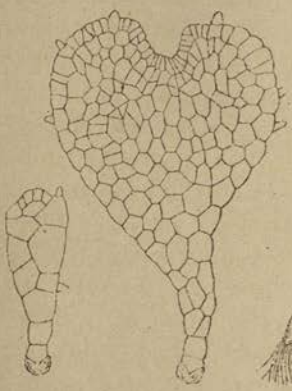
Indusium.
Bladder Fern.

Indusium.
Hart's-tongue.

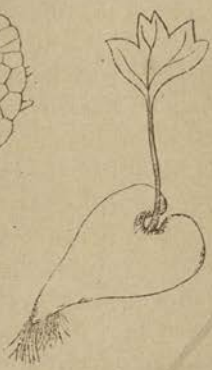
Sorus.
Bladder Fern.



Sporange.
Male Fern.



Germinating Spore.
Prothallus.
Male Fern.



Prothallus.
More advanced.

Antheridium.

Antherozoid.

Archegonium.

Young Royal Fern
with remains of Prothallus.

Pl. E.

green hue. The difference of the form, which is often so elegant and delicate in outline, gives to the ferns their grand attraction. Sometimes the frond is simple—that is, like a long narrow leaf, with waved edges, as in the Hart's-tongue; but by far the greater number of our native ferns have their fronds divided into numerous branches and segments.

The most simple form of division is the pinnatifid. In this the edge of the frond is cut into deep segments, nearly but not quite down to the rachis, as in the Scaly Spleenwort. When the frond is divided quite down to the rachis, leaving small portions of the rachis between each green leafy part, it is called *pinnate*, each little leaflet being called a *pinna*. This may be seen in the Sea Spleenwort. When these pinnæ are again divided, in the same manner as in the Royal Fern, the frond is said to be *twice-pinnate*, and the series of little leaf-like divisions are termed *pinnules;* but when the pinnæ are not cut down quite to the rib, and are only lobed, they are termed *pinnatifid*, as in the Mountain Fern. Several of our ferns are thrice-pinnate, such as some specimens of the Black Spleenwort, the Lady-fern, and the Bracken. Fronds which are thrice-pinnate are called *decompound*.

The peculiar scroll-like form which the fronds of ferns exhibit while yet unfolded, must have been observed by all who notice our hedge-banks during spring; for they may often be seen there with the blue-bells, and anemones, and primrose clumps. In compound ferns, like the Common Bracken, the divisions are also each rolled into this form, and exhibit, therefore, a number of pale green curves, resembling the shepherd's crook, or the bishop's crosier. This mode of unfolding is termed *circinate*. Many exotic ferns unfold in a different manner; and two of our wild genera, the Moonwort and Adder's-tongue, are without the circinate arrangement of their young fronds.

The mode in which the fronds are traversed by veins is termed their *venation*, and it is usually so unlike the veining of an ordinary leaf as to be at once characteristic of a fern; so that even when these plants are without their reproductive brown clusters, one may always recognise the green frond as that of a fern. By holding up a young fern leaf to the light, it is easily perceived that the veins in most cases have a forked character; that is, they branch off in pairs. Occasionally, indeed, one vein may be seen running straight from the mid-rib to the margin, without branching; yet, in almost all instances, the vein becomes forked almost immediately on leaving the mid-rib. The mode of veining, in different families of ferns, affords a characteristic distinction, to which more or less importance is attached by different botanists. It is on some spot among these veins that the capsules or seed-vessels are placed; and that particular point is termed the *receptacle*, its position with regard to the veins affording a good means of determining genera and species.

Every one who has gathered, from wall or hedge-bank, during autumn, any of our native ferns, has seen on the back, or more rarely on the margin, a number of powdery patches, often of a deep rich rust-brown colour, or occasionally, as in the Common Polypody, bright orange. They are sometimes circular, as in this Polypody; or they lie along the leaf in oblong patches, between the mid-rib and the margin, as in the Hart's-tongue; or they run together into a mass, and cover the whole back of the frond, as in the fern

called the Wall Rue; or they form a ridge along the edge of the leaf, as in the Maiden Hair. More rarely they cluster closely, till all the segments of the leaf are contracted and curled up round the masses of fructification, and then they have an altogether different appearance, and resemble a kind of inflorescence. Our beautiful tall plant, called Royal Fern, and the little Adder's-tongue found on pasture-lands, are instances of this form of fructification.

The small patches on the backs of fern-leaves are the *sori*, or clusters of capsules. The capsules themselves are sometimes termed *spore-cases*, or *sporangia*, or *thecæ*, and they contain the *spores*, which are the bodies from which another generation of ferns is produced. It is a mistake to call them seeds, for they differ widely in nature and origin from the seeds of flowering plants. A seed contains an embryo plant like that by whose floral organs it was produced. A spore is a mere cell without cotyledons; and instead of sending a shoot up into the air and radical fibres downward, as the seeds of flowering plants do, it germinates indifferently from any part of the surface, but produces a plant quite unlike its parent.

The capsules, as seen under a microscope, are beautiful objects, resembling little hollow spheres of crystal, tinged with a delicate brown hue, and surrounded by a jointed elastic ring, sometimes supported below on an exquisitely slender stalk. When the spores are fully matured, the ring is broken and its elastic nature causes various quick movements, by which the spores are jerked from the capsule like fine dust. In some plants, as in the Royal Fern, the Moonwort, and the Adder's-tongue, the seed-cases are destitute of the elastic ring, and are two-valved.

These clusters of spore-cases are sometimes formed outside the skin of the leaf, and are without covering; but in most of our native ferns, especially during their early growth, the sori are covered by a thin membrane called the *indusium*. If we examine a young frond, we see first a number of little pale-coloured stripes appearing at equal distances upon some of the veins. In a short time the outer thin skin or cuticle of the leaf above these stripes separates a little from the green part; then it becomes raised by their growth, the raised part assuming the form of the little heap of capsules beneath; till finally these burst through the skin, and separate it into two equal parts, one edge of which remains adhering to the leaf. This thin skin is the indusium, and it frequently disappears before the spores are ripened. The spores of ferns are very numerous, exceedingly minute, and of a somewhat oval form.

A fern-spore on germinating gives rise to a minute green scale (*prothallus*) which lies flat upon the ground, to which it becomes attached by delicate root-hairs from its under surface. This body is altogether different from a fern, and cannot grow into one, but it can develop organs by the interaction of whose products a true embryo may be produced, which may then grow into a fern. These organs are microscopic in size, and of two kinds. The first is the *antheridium*, and it corresponds roughly with the anthers of a flowering plant; but instead of discharging quiescent pollen-grains, the antheridium sets free a multitude of atoms (*antherozoids*) furnished with tails, and by lashing these they progress through moisture to their destination.

1. COMMON POLYPODY
Polypodium vulgare

2. C. P.
Var cambricum

3. C. P.
Var hibernicum

Pl. 279.

The second kind of organ is the *archegonium*, corresponding to the ovary of a flowering plant. Within its centre is a free germ-cell, and when some of the antherozoids have found their way to it and combined with it, this becomes fertile and produces fronds. Then the prothallus wastes away and ceases to exist. Diagrams of these organs will be found on Plate E.

The frond of the fern arises from the rhizoma or rootstock, which may be generally described as a creeping underground or horizontal stem, though in some exotic species it rises erect, and emerging from the earth, resembles the shaggy trunk of a palm. Some of our own species assume the vertical attitude, though their crowns rise only a few inches above the ground. The rhizoma of our native ferns is usually covered with shaggy scales or hairs, which sometimes, as in the Common Brake, are so fine and numerous, that they form a surface of velvety down. Sometimes this rhizoma sends out so many shoots, that they form a firm network beneath the surface of the soil; but more often this portion of the fern occupies little space in the ground. The true roots of ferns are the fibres which descend from the rootstock.

The native species of Fern described are between forty and fifty in number: but some authors make them more, and others less, numerous. The Horse-tails and Club-mosses are fern-like plants, and not true ferns, though they are commonly called jointed or leafless ferns. None of our ferns in their ordinary state attain more than six or seven feet in height, and we rarely find any, except the Common Brake or the Royal Fern, nearly so high. When growing in large numbers, they are sometimes conspicuous on the landscape; but nowhere in Britain do they give, as in tropical climates, a characteristic feature to the scenery, or assume the dimensions of trees. Herbaceous ferns belong chiefly to temperate and colder countries; but in the warmer regions, shrubby ferns cover the ground, forming, like our Common Brake, an undergrowth in woods; while the herbaceous species are found chiefly growing upon trees, where, clinging sometimes to the topmost boughs, or investing the rugged trunks with their green sprays, they display a luxuriance and beauty unknown to the British fern. Tree-ferns, too, of exquisite grace and beauty, grow in the tropical forest. Whether, however, of humble growth, or rising to the height of twenty or thirty feet; whether herbaceous or arborescent in habit, they have all so much similarity of general appearance, that they are readily known to be ferns, even by those who have never studied the botanic description of plants. On the forks of some of the old timber trees in Australia grow also the Stag's-horn Fern (*Platycerium alcicorne*), as large as the largest cabbage, the frond resembling the palmated antlers of the moose and reindeer. This luxurious growth extends to a variety of other herbaceous and shrubby species, which hang upon the stems and branches of trees, or rise as an undergrowth to the towering ferns from whose tops spring large fronds, often eight or ten feet long, thrice-pinnated, and so graceful and light that the smallest breeze sets them in tremulous motion. The works of Baron Humboldt abound in descriptions of the ferns in the forests of South America; and every writer on New Zealand tells of the ferns of that island. Humboldt remarks that the arborescent ferns produce the densest of shade in the American forests, by reason of their number and luxuriant growth. He describes some of the old trunks of

these ferns as having a metallic lustre, owing to a carbonaceous powder with which they are covered, and he adds that no other plant exhibits this phenomenon. This traveller brought away some of the powder from the old trunks of the *Aspidium* and *Meniscium*. In the time of Linnæus four species only of tree-ferns were known, but a large number have been described by later botanists; and more than 2,500 species of ferns, comprising the arborescent and herbaceous forms, are known to science. The tree-ferns greatly resemble palm-trees in appearance, and the stems of both are so much alike, that fossil specimens have frequently been described as ferns, but which on further investigation have proved to belong to the Palm tribe.

The conditions under which ferns flourish differ somewhat in different genera; but heat, moisture, and shade are necessary for the luxuriant development of the greater number. They are more numerous in islands than on continents, the arborescent species being almost confined to the torrid zone: the shrubby species generally also preferring a climate of intense heat, and the herbaceous species grow in temperate climes, and are found more rarely in the colder countries, while the northern part of the globe seems quite destitute of any species of this elegant family of plants. As regards the ferns of this kingdom, some grow in almost every county; while some, peculiar to mountainous districts, delighting in limestone soils, or thriving only on the basaltic trap, are necessarily local or rare. Very few of our native species will bear the sea-air, yet this is needed for the luxuriance of that beautiful plant of the sea-caves and cliffs, the Sea Spleenwort; while the Wall Rue and Black Spleenwort grace the ruined building or barren rock. The Northern Hard Fern is unhurt by its exposure to the sun and wind of the heath; and the *Lastrea thelypteris* is a true marsh fern. Most of our ferns luxuriate in a shady spot, on a vegetable mould formed of the fallen leaves of many winters, or they wave unseen over the stones of quarries, or among rocks; but their number has doubtless been greatly lessened by the increase of agriculture during past centuries.

The terms employed in the description of ferns are few. A linear leaf, or leaflet, is one of which the two sides are parallel, like the leaf of the grass: the term decurrent signifies that the leafy portion runs down the side of the stalk, and gradually merges into it. The margin is sometimes serrated or notched like the edge of a saw; a fertile frond is one bearing the fructification; a barren frond, one from which that fructification is absent. In some ferns, as in the Northern Hard Fern, the barren and fertile fronds are differently formed.

TABLE OF THE ORDERS AND GENERA OF THE BRITISH FERNS.

This order consists of flowerless leafy plants, their leaves or fronds, with some few exceptions, gradually unfolding in a scroll-like manner, and bearing their spores in capsules on the backs or margins of the fronds. These capsules are either one-celled and stalked, with an elastic ring; or are without stalk or ring.

PALE MOUNTAIN POLYPODY.
Polypodium phegopteris.

Sub-Order I. POLYPODIACEÆ.

** Capsules with a vertical elastic marginal ring, which bursts irregularly.*

1. POLYPODY (*Polypódium*).—Capsules seated on the back of the frond in circular clusters, without an indusium; veins in the British species, simple or forked. Name from the Greek *polus*, many; and *pous*, a foot; either from the shape of the frond, or from the branching rootstocks of some species.

2. GYMNOGRAM (*Gymnográmme*).—Capsules seated on the back of the frond, in linear clusters, without an indusium; veins in the British species, simple or forked. Name from the Greek *gymnos*, naked; and *gramme*, a line or letter, from the fancied resemblance of the forked veins to alphabetical letters.

3. ROCK-BRAKE (*Allosórus*).—Capsules on the back of the frond, the edges of its lobes rolling under, and forming an indusium. Fronds of two forms; the barren frond leaf-like; the fertile contracted, and bearing the fructification at its margin. Name from the Greek *allos*, various, and *soros*, a mass. Also known as *Cryptogramme*.

4. WOODSIA (*Woódsia*).—Capsules at the back of the frond, covered by a roundish or kidney-shaped indusium, attached beneath the clusters, and cut at the edges into many thread-like segments. Name in memory of Joseph Woods, author of "The Tourist's Flora," etc.

5. BUCKLER FERN (*Lastréa*).—Clusters at the back of the frond, nearly circular, covered by a kidney-shaped indusium, attached at the notched side; veins distinct after leaving the mid-rib, not uniting with the adjoining lobe. Name from M. De Lastre, of Chatellerault. Generally known as *Nephrodium*, but the British species are all members of the sub-genus Lastrea.

6. SHIELD FERN (*Polýstichum*).—Clusters seated at the back of the frond, covered by a circular indusium, attached at its centre. Name from the Greek *polus*, many; and *stichos*, a row; from the regular lines formed by the clusters of fructification. This is a sub-genus of the genus *Aspidium*.

7. BLADDER FERN (*Cystópteris*).—Clusters of fructification roundish; indusium hooded, and attached by its broad base. Name from the Greek *kystos*, a bladder; and *pteris*, a fern, in allusion to its hollow indusium.

8. SPLEENWORT (*Asplénium*).—Clusters at the back of the frond, oblong or linear, attached along the upper or inner side of the veins; indusium opening towards the mid-vein, or inwardly. Name from the Greek *asplenon*, given by the ancients to some fern which they believed to affect the spleen.

9. LADY FERN (*Athýrium*).—Clusters at the back of the frond, covered with a kidney-shaped or crescent-shaped indusium, attached along the upper side of the lateral veins, opening towards the mid-vein, its margin fringed with slender hair-like segments. Name from the Greek *athyros*, open; because the indusium stands out separated from the frond, and is at length turned back open from it. This is a sub-genus of *Asplenium*.

10. SCALY SPLEENWORT (*Céterach*).—Clusters of capsules at the back of the frond, placed on netted veins, and lying among thick masses of dark brown chaffy scales, which cover the whole back of the frond; indusium obsolete. Name supposed to be the *Cretherak* of the Arabian physicians. This is a sub-genus of *Asplenium*.

11. HART'S-TONGUE (*Scolopéndrium*).—Clusters on the back of the frond, long, narrow, straight, and in pairs; indusium double; the two portions opening towards each other. Name from *scolopendra*, a centipede, from a fancied similarity between the lines of fructification and the feet of that animal.

12. HARD FERN (*Blechnum*).—Fructification at the back of the frond, in two narrow lines, one on each side the mid-rib, and covered each by a continuous indusium. Name from the Greek *blechnon*, a name for a fern. Also known as *Lomaria*.

13. BRAKE (*Ptéris*).—Fructification seated at the back of the frond, or rather in a line at its margin; the indusium formed of the reflected edge of the frond, which dilates into a membrane. Name in Greek, *pteris*, a fern, from *pteron*, a plume or feather.

14. MAIDEN HAIR (*Adiántum*).—Fructification at the back of the frond, in roundish or oblong clusters, covered by distinct portions of the reflexed membrane-like margin of the frond, opening towards the mid-rib. Name in Greek denoting unwetted, from the peculiar tendency of the fronds to throw off water.

Sub-Order II. HYMENOPHYLLACEÆ.

* * *Capsules opening irregularly, having a horizontal or oblique ring, and enclosed in a 2-valved, membrane-like involucre, terminating a vein at the margin of the frond.*

15. BRISTLE FERN (*Trichómanes*).—Fructification on the margins of the frond, the clusters having a cup-shaped indusium or involucre of the same texture as the frond, and terminating a vein. Name from the Greek, signifying hair and excess, from its bristle-like receptacles.

16. FILMY FERN (*Hymenophyllum*).—Fructification on the margin of the fern; the clusters seated within a 2-valved involucre, which is an expansion of the frond. Name from the Greek *hymen*, a membrane; and *phyllon*, a leaf.

Sub-Order III. OSMUNDACEÆ.

Ferns having the young fronds rolled up in a scroll-like manner, the capsules clustered on the margin of a transformed frond, and forming a panicle, without an indusium; capsule destitute of a ring, and opening vertically by two valves.

17. ROYAL FERN (*Osmúnda*).—Capsules clustered into a branched panicle, terminating the frond. Name apparently given from the Saxon words *os*, house, and *mund*, peace, or from *Osmunder*, a name of the god Thor.

Sub-Order IV. OPHIOGLOSSACEÆ.

Ferns having their young fronds folded straight and not coiled, capsules arranged on a separate branch of the frond, without a ring or indusium, coriaceous, and opaque in texture.

18. MOONWORT (*Botrýchium*).—Capsules roundish, sessile clustered at the

TENDER THREE BRANCHED POLYPODY.
Polypodium dryopteris.

Pl. 281.

RIGID THREE-BRANCHED POLYPODY.
Polypodium calcareum.

margin, and on one side of a pinnated stalk. Name from the Greek, *botrys*, a bunch of grapes, from the appearance of the clusters.

19. ADDER'S-TONGUE (*Ophioglóssum*).—Capsules 1-celled, 2-valved, forming a compact two-ranked spike. Name from the Greek, *ophis*, a serpent, and *glossa*, a tongue, from the supposed resemblance of the fructification to the tongue of a serpent.

Sub-Order I. POLYPODIACEÆ.

1. POLYPODY (*Polypódium*).

1. Common Polypody (*P. vulgáre*).—Fronds deeply pinnatifid; the segments oblong, and tapering or rounded at the end, the upper ones generally smaller. This is one of the commonest of our ferns, and one which is of easy recognition. It is abundant on all parts of our island, now hanging down from the gnarled branch or sturdy trunk of the old oak, now growing in large clumps on the hedge-bank, and forming a good foreground for the artist's sketch; while sometimes it may be seen waving its bright green leaves above the cottage thatch, or on stone wall or rugged rock. The frond varies from a few inches to a foot and a half in length, and attains its full expansion earlier than most of our native ferns, being usually developed by the month of May. If in a sheltered spot, it retains its verdure till December, but on an exposed situation it is easily destroyed by frosts. The leaves have a faint and rather disagreeable odour, and, if tasted, leave a rough and unpleasant feeling on the tongue. Several foreign species of Polypody are, however, aromatic, and the fronds of some are used by the natives of the Sandwich Islands to give a perfume to the cocoa-nut oil with which they anoint themselves. The roots of our common species are very numerous, forming entangled masses, and the horizontal stems are entirely covered, when young, with pale brown scales, which disappear as the plant becomes older. The slender stalk of the frond rises from this brown creeping stem, and the leafy portion usually extends rather more than half-way down. This is lanceolate, and divided into lobes, almost to its mid-rib. The lobes are usually oblong, and rounded at the end, but in some specimens they taper to a point. The margin is generally entire, but is sometimes slightly serrated. A mid-vein winds through each lobe, and lateral veins are produced alternately from it. The same alternate disposition is to be seen in the veins arising from these, which are generally four in number, and it is usually on the lowest of these branches that the large, round, bright, orange-coloured clusters are seated; the remaining veins, which are barren, have little club-shaped extremities. The fructification is very conspicuous, and is usually placed at the upper part of the frond.

This plant, like the common brake and several other of our native ferns, contains a large proportion of carbonate of potash, which in former days was used by glass-manufacturers. The fern was also formerly praised for its medicinal virtues, and the mucilaginous liquid obtained by boiling its fronds had much repute among herbalists as a remedy for pulmonary affections. When boiled with liquorice, it is a very good medicine for cold and cough; but it requires boiling for a long time, till the decoction becomes slightly

bitter. Michael Drayton, who calls it the "jagged polypodium," elsewhere describes it as the "rheum-purging polypody." In Paris this and the mucilage obtained from the leaves of the lime-tree are deemed, and not without reason, very useful in colds; but, except in villages, the plant is scarcely used in this country. Mr. Newman remarks that he has seen women collecting it in Herefordshire as a specific against hooping-cough. He says that it is gathered in October and November when in fruit, the barren fronds being rejected. It is hung up in the cottage to dry, and, when required for use, is slowly boiled with raw sugar. The people who were gathering it called it by its old names of Golden-locks and Maiden's-hair. We have known it to be gathered for a similar purpose in Kent, where it is called Golden Polypody and Golden Maiden-hair, doubtless from its bright orange-coloured masses of fructification. In this case, however, it was deemed of great importance that the plant should be gathered from the oak, and not from the shady hedge-bank or other tree. Several species of Polypody are used for medicines in other countries. The various species, of which there are nearly 400, adorn the tropical lands of the Western Hemisphere, where they attain great luxuriance; and our Common Polypody, which is found all over Europe, grows in many parts of Asia and America, either this or a very similar species being one of the commonest ferns in many of the woods and hedges of North America. Sir Joseph Hooker says that in Calcutta the Hindoos boil the young tops of a Polypodium with their shrimp-curries. Mr. Bennet, in his account of the South Sea Islands, mentions a species of Polypody which he found at Mahiatea, growing in abundance on a high mound built of coral stones. He says that the natives call it *Atua-buua*, or Pig's-god, and believe it exercises a watchful care over the well-being of these animals.

Several little variations occur in the form of our Common Polypody, the lobes being more or less cleft, or acute, or serrated. One of the most important is that termed *cambricum*, the Welsh Polypody, in which the lobes become broader, and are again irregularly lobed and toothed. This is always barren. It is an exceedingly handsome form of the fern. The French call this fern *Le Polypode;* the Germans *Der Tipfelfarren.* It is the *Boomvaren* of the Dutch, the *Polepodio* of the Spaniard and Italian, and is known in Russia by the name of *Osokor.*

2. **Beech Fern** (*P. phegópteris*).—Fronds pinnate, the pinnæ united at the base and pinnatifid, the lowest pair turned downwards, and all the rest upwards; fructification marginal. This very beautiful plant is called also, Sun Fern and Mountain Fern. It has a preference for mountainous localities, where it often occurs at a great elevation, and it grows also in shady, rocky woods. Though a local plant, it is often abundant on particular spots. It is more frequent in Scotland than in England, and is of only local occurrence in Ireland. It is found in the northern and western counties of England, but is unknown in those counties that are at once south of Derbyshire and east of Gloucestershire. It flourishes particularly near waterfalls; by the Falls of Lodore, celebrated both for their picturesque beauty, and for the singular rhymes which Southey composed on their rushing waters, this fern is one of the most graceful and lovely objects, springing up from among the

ALPINE POLYPODY.
Polypodium alpestre

Pl 283.

rich green mosses which surround it, and its pale green hairy fronds sometimes glistening with drops of the spray dashed from the fall. It is a common fern in Cumberland, growing on the very summit of some of the mountains. It has no just claim to its common name of Beech Fern; for, though found in moist, wooded places, it does not hang from the branches of that noble tree, but its brown rootstocks creep over the damp rock, or among the scattered leaves. The frond rises in May, and may be found in fructification throughout the summer and autumn. It varies in height, from six inches to about a foot, the stalk being generally about twice as long as the leafy part, and slightly scaly at the base. Its roots are black, wiry, hair-like fibres. The frond is very distinct in its outline, being triangular, and tapering at the upper part into a long point. The lower part is pinnate, the pinnæ being narrow, cut nearly to the mid-rib, and very acute at the point. They are usually in pairs, the lowest pairs being at some distance from the others, and turning backwards towards the ground. They are united to the stem by their mid-rib only; but the other pinnæ, which all point forwards, are united to the stem by their whole width, and are also connected with each other in a pinnatifid manner. This turning backwards of the lower pinnæ gives so peculiar a character to this fern, that those who have once seen it rarely find any difficulty in recognising any further specimens which they may meet with.

The lobes of the pinnæ have each a slender vein running up the middle, from which lateral veins, chiefly unbranched, issue alternately, and extend to the margin, each bearing a cluster of capsules at its extremity, so that the fructification is nearly marginal. The clusters are circular, and of a brownish hue. The young fronds unfold their coils very early, and these often droop backwards before fully expanding. It is a very delicate plant, perishing when placed in culture where it is not protected from the sun, and dying away with the earliest frosts.

3. **Oak Fern** (*P. dryópteris*).—Fronds with three branches, the divisions pinnate, their pinnæ cut into segments nearly to the mid-rib, blunt, the uppermost entire; clusters of capsules nearly marginal. This very elegant species is sometimes called by the very characteristic name of Tender Three-branched Polypody. The triple fronds are a marked character of the plant, and it is slender in form, thin, smooth, and fragile in texture. The height of the frond is from four to six inches, and its colour is of a brighter green than that of almost any other British fern, though it loses this brightness if placed in a spot exposed to the sun. Its mode of unfolding the young fronds is very remarkable. In March and April these emerge from the soil, exactly resembling, as Mr. Newman has said, three balls on wires. These folded scrolls daily uncoil to the air and shaded light, till, by the end of June, not only are the three graceful branches developed, but the dark-brown masses of spore-cases are crowding upon their under-surfaces. Like many another plant, however, which rapidly attains perfection, it is somewhat short-lived, not surviving the earliest frosts. The stalk is very slender, about twice the length of the leafy part of the frond, of dark purplish colour, very brittle, with a few scales at its base. The three branches of the frond are triangular, each having a short stalk, and the three uniting in an angular manner with

the common stalk of the frond. They spread loosely, and are moved by the slightest wind, the middle branch being the largest. Each branch is pinnate at the base, and pinnatifid at the upper part; the pinnæ are also pinnate at the base, and pinnatifid and gradually tapering at the top, the edges near the point being undivided, the pinnules and lobes oblong and obtuse. The pair of pinnules at the base of each pinna, close to the mainstalk of the frond, are so nearly of a size, and so placed, that when the pinnæ are exactly opposite, they stand in the form of a cross; the two nearest the summit of the branch being smaller than the two opposite, and more nearly in a line with the rachis. There is an angular bend in this fern, just at the point of the rachis where the side branches rise.

A mid-vein winds through each lobe or pinnule, and the lateral veins are usually alternate and without branches. Each terminates at the margin, and the clusters of fructification, which are circular and of pale brown, are placed at its extremity. Sometimes the clusters are densely crowded; in other specimens they are scattered and remote. A large number of the fronds are barren, and the fertile ones are generally taller than those without fructification.

The Three-branched Polypody is not infrequent in moist woods, and in stony, barren, mountainous places both in England and Wales, excepting that part of England which lies eastward of Derbyshire, Gloucestershire and Devonshire. It is common in Scotland, and is very generally distributed, being found in every country of Europe. Its underground stem is slender, black, wiry, and creeping to a great distance. This fern is by Mr. Newman termed *Gymnocarpium dryopteris*. The dried specimen of the Herbarium, though preserving well the outline of this fern, gives no idea of its attitude while living. This is gently drooping, not only the whole leafy portion bending down, but the lobes curving down also.

4. **Limestone Polypody** (*P. calcáreum*).—Fronds triangular, somewhat three-branched, lower branches pinnate, the pinnæ pinnatifid, blunt, the uppermost nearly entire; fructification marginal. This plant is also known as Smith's Polypody, or Rigid Three-branched Polypody. Notwithstanding, however, its latter name, it is far less distinctly three-branched than the last species, and is very different from it in its habit. The lower branches are much smaller in proportion to the middle one, and all are erect and rigid. It has not either, in any great degree, the angular bend in the stalk of the frond which so well characterizes the Oak Fern, though it in some specimens slightly shares this peculiarity. It is also a more rigid and firm plant, of a darker, duller green; its stalk is more scaly at the lower part, and green instead of purple; its clusters of fructification are usually more densely crowded; it has also a marked distinction in the mealy appearance presented by the surface, owing to numerous stalked glands which crowd over every part of it. The fronds are from six inches to a foot high, nearly triangular, the base shorter than the sides. The stalk is of about the same length as the leafy part; but the side branches are not only shorter, but are more slender than the middle one. The lower branches are pinnate, and the pinnæ are cut down nearly to the mid-rib; the upper branch is pinnate, with its lower pinnæ again pinnate, and the upper ones pinnatifid

1 FINE LEAVED GYMNOGRAM.
Gymnogramme leptophylla

2 PARSLEY FERN.
Allosorus crispus

as are also those of the lower branches, and the upper part of the frond. A distinct winding mid-vein may be seen in each pinnule or lobe, whence issue lateral veins, either simple or slightly branched, near the termination of which, towards the margin, are placed the round clusters of fructification, which in the autumn run into a crowded mass, and form a marginal series. The underground stem of this fern is dark-brown and creeping, and its fibrous roots tough. Freshly-gathered specimens exhibit a degree of downiness on the frond. It is a rare fern, growing among the loose stones of the limestone regions. It does not thrive so well as several of the species in gardens near towns, but sometimes in country gardens it grows well, requiring lime to be mixed with the soil. It seldom grows very abundantly, though it is plentiful on the rocks of Buxton, about Matlock Baths, and the Cheddar cliffs, for it seems never to grow wild except in limestone districts. Some authors term it *Polypódium robertiánum*, and under this name it is now usually regarded as a sub-species of *P. dryopteris*.

5. **Alpine Polypody** (*P. alpéstre*).—Fronds lanceolate, twice pinnate; pinnules linear-lanceolate, pinnatifid, with blunt sharply-serrated lobes. This fern had long been known as a native of Switzerland, as well as of several countries at the north and in the middle of Europe, but it was first discovered in Britain in 1841, by Mr. Watson, on the mountains near Dalwhinnie, and at Great Corrie of Ben Alder, Inverness-shire. It was not, however, until 1844, when this botanist again saw this fern in Canlochen Glen in Forfarshire, that its claim as a British plant was fully recognised by botanists, and it was proved to be the fern known by Continental writers as *Aspídium alpéstre*, or *Aspídium rhæticum*. It is so like the Lady Fern (*Athyrium filix-fœmina*) in its outline and general appearance, that it has doubtless often been overlooked, and believed to be an alpine variety of that plant; for it has since been found to be a not infrequent fern on mountains from Sutherland to Argyll and Perth. Some writers consider that this fern has at an early period of its growth an indusium over its circular clusters, and this may have induced the Continental botanists to class it with *Aspidium*. Mr. Newman constitutes it a new genus, and calls it *Pseudathýrium*; while a very elegant form of the fern, termed by him *P. flexile*, has proved to be but a variety of this plant.

This Alpine Polypody is a very graceful fern, the fronds growing in circular clumps from the crown of a creeping rhizome, and being a foot or a foot and a half high. These fronds are lanceolate, twice-pinnate, narrowed to the base, as much so as at the upper part of the frond, and the leafy portion extends almost to the base of the scaly stalk. The pinnæ are lanceolate and tapering; the pinnules lanceolate, acute, and deeply pinnatifid, with serrated segments. The clusters of fructification are small and circular, and are generally placed on the depressed spots between the lobes of the pinnule, and thus form two distinct lines on each side of the mid-rib, and parallel to it; but sometimes they are more numerous, and in maturity form one mass. In the var. *flexile* the stipes is very short, the pinnæ are short with a downward rather than an upward tendency, and the pinnules are not crowded as in the type.

2. Gymnogram (*Gymnográmme*).

Fine-leaved Gymnogram (*G. leptophylla*).—Fronds egg-shaped, twice pinnate; pinnæ roundish, wedge-shaped, three-lobed, the lobes cut and toothed, blunt. This pretty, fragile little fern is an annual plant, very well known in the countries at the south of Europe, and a native of the Atlantic Islands, as well as of Jersey. In the latter island it is not an uncommon plant on grassy hedge-banks, and by the side of rivulets. For many years past its growth in Jersey has caused its enumeration among British ferns, but it appears also to grow in some part of the United Kingdom, for a correspondent of the *Gardener's Chronicle* for January, 1853, sent for inspection to Professor Lindley a specimen of this fern found in Britain, and, as he observes, entirely new to this country. The writer avoided giving the locality, doubtless from the apprehension that if he did so, some botanists might visit the spot, and entirely eradicate the fern, in order to increase the stores of their own fernery or herbarium. He remarks: "This morning I examined the place where it was gathered last year, and found that it is coming up plentifully again. It is growing in a clay soil, on a bank at the foot of a hill, and is much overshadowed with ivy and larger ferns. *Asplénium lanceolátum* grows plentifully all round it, and the bank is in that part covered with a small round lichen. The situation is very damp and much sheltered, and the fern is scattered over a surface of two or three yards; but I can find no trace of it over any other part of the bank, and I have never met with it on any other part of the island. The place where it grows is unfrequented, and I do not think it possible it should be anything but wild." This secret station remains a secret, for Jersey is still the only locality published in our Floras.

This fern requires a sandy loam or other light soil when cultivated, and must be kept in shadow and in a moist atmosphere. At the latter end of summer its fronds arise from the spores shed in spring, and are very small and usually barren; but, early in the following year, some taller fronds gradually develop themselves, and these are, when fully grown, about three or four inches high, and extremely delicate in texture. They are twice or thrice pinnate; the pinnæ and pinnules alternate or opposite; the end pinnules bluntly wedge-shaped or rounded, about three-lobed, the lobes terminating with two blunt teeth. The pinnule has a mid-vein, from which issues a forked vein, on which the cluster of fructification is placed, a part of the cluster occupying each branch of the vein, so that the cluster itself is forked; after a time, however, the fructification forms a mass over the whole under surface of the pinnules.

3. Rock-brake (*Allosórus*).

Curled Rock-brake, Mountain Parsley, or Parsley Fern (*A. críspus*).—Barren fronds, twice or thrice pinnate; segments wedge-shaped, linear, oblong; segments of the fertile frond oblong. Many persons visiting the lakes at the north of England bring back with them a few fronds of this elegant little fern; and it is so beautiful in outline, and often renders

1. OBLONG WOODSIA.
Woodsia ilvensis

2. ROUND LEAVED W.
W hyperborea

the rocks so richly tinted by its green fronds, that it tempts even those who are not botanists to gather it. Southey, who describes it as the Stone Fir, or Mountain Parsley, says it is the "most beautiful of all our wild plants, resembling the richest point lace in its fine filaments and exquisite indentations." We have sometimes, while looking at it, recalled the words of Milton:

> "For not to use alone did Providence
> Abound, but large example gave to man
> Of grace, and ornament, and splendour rich,
> Suited abundantly to every taste,
> In bird, beast, fish, winged and creeping thing,
> In herb and flower."

Graceful it is, and delightful to the eye of the lover of nature; though neither singing bird, nor brightly-tinted insect, nor useful cattle, can find nourishment in its luxuriance.

The favourite place of growth of the Rock Parsley is among the rugged masses of stones and broken rocks which lie at the base or on the slopes of mountains, in the north of England. It extends as far south as North Devon, but is entirely absent from the east of England; and in Ireland it is very rare. At first sight its crisped sprays might be taken for a tuft of the leaves of common parsley, and it is as bright and green as that herb in early summer. Here and there some patches of the plant gather in abundance and beauty on the slate mountains of Cumberland, relieving their dark tint by the verdant fronds; and many an enthusiastic botanist, who has visited the slate and trap rocks of Snowdon, has hailed this lovely fern with rapture, as he beheld it covering their rugged surfaces in wild profusion.

Both the barren and fertile fronds of the Parsley Fern are twice or thrice pinnate, but the nearly wedge-shaped segments of the barren frond are often cleft at the end. These fronds are more numerous than the fertile ones, and generally of a much lower growth, and of a brighter, more yellowish green. The fertile frond is nearly triangular, from six to twelve inches high, and the segments are oblong, oval, or linear in form. The divisions of this frond have a winding mid-vein, producing lateral ones, either forked or simple, which extend nearly to the margin, and bear at their extremities the round clusters of spore-cases. These are covered by an indusium, which in this species is a thin white continuation of the margins of the leaflet, which are rolled under. In the early stage of their growth we may see the circular form of the clusters, as they are then distinct; but they afterwards mingle into two continuous lines of bright brown fructification.

The stalk of the frond is smooth, pale green, slender, very brittle, and usually longer than the leafy part; and the delicate green fronds rise in great number from the horizontal stem, forming a dense mass, and holding very fast to their rocky soils by their black, tough, numerous fibres. They rise in May and June; but he who should visit their localities during winter, would see no remains of the verdant hue with which they clothed the rocks in spring. This Rock-brake is termed by some botanists *Cryptogramme crispa*; it is the *Osmunda crispa* of Linnæus. It grows freely in cultivation, but requires shade, as too much sunshine renders its green hue less vivid.

4. Woodsia (*Woódsia*).

1. **Round-léaved or Alpine Woodsia** (*W. alpína*).—Fronds pinnate; the pinnæ pinnatifid, hairy beneath; clusters of spore-cases solitary at first, afterwards mingling in one mass. The only two native species of this genus of Ferns are both very rare plants. They have some peculiarities which readily distinguish them from any others. Their indusia, instead of covering the clusters of spore-cases, as in other genera, are attached beneath them, enclosing them while young, but tearing as they grow older into numerous little chaffy segments, which look like tufts of slender hairs placed around the clusters. This little fern grows in tufts; its fronds never more than two or three inches in height, and more commonly about an inch high. It is only to be found growing in fissures of alpine rocks, mostly in places rarely visited. It has been seen on Snowdon and Ben Lawers, and also in the Glen of the Dole, Clova, and other places of the Eastern Highlands. Its stalk is very slender and smooth, only that a few small scattered hairs and scales may be seen upon it at an early period of its growth. The frond is long, narrow, almost linear, and pinnate. The pinnæ are perfectly distinct, and sometimes distant from each other, obtusely triangular, and lobed, and they are usually alternate on each side of the rachis; those at the lower part of the frond being generally farther from each other than the higher leaflets. The upper surface is nearly smooth, but a few minute hairs are scattered along the margin and under surface. The veining is not a very marked feature of the species. There is no distinct mid-vein, but small veins branch into each lobe, not quite reaching the margin of the leaflet. At the extremity of these veins are placed the clusters of capsules, which soon form a crowded mass. The frond is of a brownish-green colour; the roots black, wiry, and branched; and the underground stem very large in proportion to the frond. Many botanists consider that this species and the next should be united, as they doubt if there is any specific difference between them. This fern is also known as *Woodsia hyperbórea*.

2. **Oblong Woodsia, or Ray's Woodsia** (*W. ilvénsis*).—Fronds lanceolate or oblong, pinnate, hairy beneath. This species grows on the most elevated and bleak mountainous places, among the fissures of rocks. It has been found on Clogwynn-y-Garnedd, Snowdon, and Llynn-y-cwn, on Glyder Vawr, Wales; on the Clova mountains, Scotland; as well as in Durham, where Mr. Backhouse found it growing at the base of some basaltic rocks on the Durham side of the river Tees, about 200 yards below Cauldron Snout. It is said also to have been found formerly in Westmorcland, where a single frond was gathered from the old walls of Crosby Ravensworth Church; but these walls have now been taken down. The fronds of this species are about two or three inches high, and are covered on both sides with shining hairs, which are, however, on the upper surface invisible to the naked eye. The clusters of spore-cases lie among these, on the under surface, and are almost hidden by them. A few chaffy scales are scattered on the stalk, and this has a joint at a short distance from its base, at about three-quarters of an inch from the point at which it joins the rhizome—a character

MARSH FERN
Lastrea thelypteris

Pl. 286.

belonging to most species of Woodsia. The rhizome is tufted, and the roots black and wiry.

This fern is of a dull green colour, and dies down to the ground at the approach of winter. The frond is lanceolate in form, and pinnate. The pinnæ, which are usually in pairs, are oblong, with obtuse ends, and a deeply-lobed margin, sometimes cut down almost to the mid-vein. The mid-vein of the segments of the pinnæ is not very distinct; and the lateral veins, which are either simple or branched, issue from it towards the margin, near to which the clusters of seed-cases are seated. This Fern is often not more than an inch high, and very rarely more than three inches. It has been termed *Acrósticum ilvénse*, and is now by some writers regarded as a sub-species of *W. alpina*.

5. Buckler Fern (*Lastréa*).

1. **Marsh Fern** (*L. thelýpteris*).—Fronds pinnate; pinnæ pinnatifid; clusters marginal, near together, at length mingling into a mass. Several of the most conspicuous of our native ferns belong to the genus *Lastrea*, some of them almost rivalling the common brake in size. It was formerly comprised in the genus *Aspidium*, and its chief distinction consists in the kidney-shaped indusium which is attached to the frond at its notched part. The Marsh Fern is not one of the largest of the *Lastreas*, for its barren frond rarely attains more than a foot in height; and the fertile frond is but an inch or two higher, although under cultivation it is sometimes more than twice as high as when wild. This fern delights in moist boggy lands, occasionally growing in great abundance among the heather and sundews, and asphodels, and other bog plants; but, like some of its floral companions, it is somewhat local, and many a boggy heath of England is destitute of its fronds, while both in Scotland and Ireland it is a less common plant than in England. In Wales it occurs in numerous localities. It is a native of every country in Europe, and grows in the North of Africa and in North America. It was at one time thought to be a frequent fern in Scotland, the Heath Lastrea having been mistaken for it. Dr. George Johnston, commenting, about fifty years since, on this species, says that it had only lately been discovered to be a Northumbrian plant; and adds that it was not a little curious that this fern, which was thought to be so abundant in Scotland, should not be found at all in Berwickshire, and is so rare in the north of England, as to have escaped the notice of the many acute naturalists who have botanised there, until the late date of 1832-3, when Mr. Embleton drew it from its lurking place in Learmouth bogs, on the very verge of the kingdom. It has since been found at several spots near the lakes of Cumberland, at Hamersham Bog in Westmoreland, at Potterie Carr, Askham Bog, Heslington Fields, Buttercrambe near York, and in several other spots in Yorkshire. This fern was probably more general and abundant in our island at a period when lands were less drained and brought into culture. It is known to have disappeared from Allesley in Warwickshire. The Rev. W. T. Bree, in the true spirit of a botanist, regrets its absence from spots in which, in his earlier day, he had been accustomed to gather it. Writing from Allesley, he remarks: "A pit in this parish

formerly abounded with the Marsh Fern; the entire surface was so completely scummed over (if I may use the expression) with a thick blanket of the matted roots of the fern, interspersed with bog-moss, marsh cinquefoil, etc., that no water was visible; and, more properly speaking, the spot could not be called a pit, but a shaking bog. Some years ago the field was brought to the hammer, and purchased by an industrious, hard-working man, who, at no small expense of labour, drained the bog and converted it into profitable ground. Of course there was an end of the Marsh Fern in that situation; nor do I know, at this moment, any other habitat where it is to be found." This botanist also expresses his regret when, on revisiting a charming boggy meadow on the skirts of Chemsley Wood, near Coleshill, abounding with the rare butterworts, sundews, grass of Parnassus, cranberries, cotton grass, and the orchideous plant termed helleborine—a spot which, as he says, was "one of Nature's own botanical gardens"—he found it converted into a potato ground. This writer says that he had been delighted with the spot in his youth, and had spent many an hour in exploring its natural treasures. He adds: "It is not only to the cultivation of waste lands, and to agricultural improvements, that the extermination of some of our rarer plants is owing; it may be attributed, also, in part at least, to the rapacity of botanists, who, in some cases, too greedily pluck up, root and branch, every specimen of a rare plant they can meet with."

The Marsh Fern, though a pretty plant, is one of the least ornamental of a genus producing several ferns of peculiar grace. It has a slender stalk, arising from a black underground stem, which creeps to a great extent in the soft soil, and sends forth a large number of tough fibrous roots. The frond is lanceolate in form, and pinnate; the pinnæ are usually opposite, and cut into lobes nearly to the mid-rib; the lobes are entire, numerous, and rounded at the end, those of the fertile frond having their margins curled backwards, so as to give them the appearance of being narrower and more pointed. The colour of this fern is a pale green, and its texture somewhat thin and delicate; but the fertile frond has a much more vigorous appearance than the barren one. The latter appears in May, and the fertile frond in July.

Each lobe of the Marsh Fern has a somewhat winding mid-vein, from which the side veins branch alternately, and the clusters of fructification are seated on both branches, half-way between the mid-vein and the margin. The clusters are abundant, and in an early stage of the plant the thin, white, membrane-like indusium may be seen; but as the capsules increase in size it disappears. The fronds of this species are not so tufted as some others, but spring up, at intervals, from the long slender underground stem.

2. **Heath Fern, or Sweet Mountain Fern** (*L. oreópteris*).—Fronds tufted, pinnate; pinnæ pinnatifid; fructification marginal. This species resembles the last in so many of its characters that it has often been mistaken for it; but when growing, it has a very different aspect on the landscape. Its fronds, instead of rising here and there at distances from each other, spring up in almost circular tufts, and are usually two or three feet high; the stalk is very short, and covered with pale brown scales, while in the Marsh Fern it is smooth. As its familiar name would indicate, this fern grows on exposed and mountainous places, on heaths and dry pastures,

MOUNTAIN FERN
Lastrea oreopteris

and is found, though less frequently, on open or wooded lowland districts. On some waste lands, as those of Hampstead Heath, and the heather-clad spots about Leith Hill and Tunbridge Wells, its handsome coronals of green rise up in May, and, as summer advances, overshadow the harebells and tormentillas, and remain green till winter has swept all blossoms save the daisy from the greensward. On the hill-sides of the north of England, and in the Highlands of Scotland, it is even more frequent than the common bracken, and it is plentiful on the hilly districts of Wales, but it is rare in Ireland. Mr. Newman remarks of the fronds: "Immediately they begin to unroll they exhibit the pinnæ placed at right angles with the main stem, and are not convolute as in the allied ferns—a character worthy of particular notice, because unusual among our ferns." The fronds, which are annual, are erect, and in their outline lanceolate and pinnate, remarkably narrowed downwards from about the middle, so that the lower part is quite as tapering as the upper. The stipes is very short, the leafy portion of the frond continuing almost to its base. The pinnæ are generally opposite, and are narrow, pointed, and pinnatifid, and attached only by the mid-rib to the main stem. The fructification is very abundant, forming a line close to the margin; and this plant differs from the Marsh Fern in not having the edges of the lobes turned back. Over every portion of the under surface lie numerous small, round, glossy, bright yellow glands, which give the young fronds a golden tinge, and form a marked feature of this fern. If we handle or bruise the frond, these diffuse a pleasant odour, similar, however, to that which is possessed in a less degree by several other ferns. Some writers have, on account of this fragrance, believed this to be the species designated by Linnæus *Polypódium frágrans*. The mid-vein is very perceptible in the blunt lobes of the pinnæ. It is slightly winding and alternately branched, some of the branches being simple, others forked, and the clusters of fructification are placed at their extremities. The scales are so numerous at the lower part of the stipes as to remind one of the pale brown shaggy mane of an animal, and they are more or less continued to the upper part. The underground stem is scaly, and the roots numerous and tough.

This fern grows throughout Europe, and is called by various writers *Nephrodium montánum* and *Lastréa montána*.

3. **Rigid Fern** (*L. rígida*).—Fronds twice-pinnate; pinnules narrow, slightly pinnatifid; lobes serrated, without spinous points to the teeth; indusium permanent, fringed with glands. Notwithstanding the rigid nature of this species, which renders its green fronds less graceful in attitude than some which bow more readily to the winds, yet it is one of the most elegantly formed of the genus, and it is clearly marked by the beautiful divisions of its frond. It grows erect, rising from a thick underground stem; the frond is annual, appearing in May, and dying as soon as the early frosts commence. It is usually one or two feet high, and in various specimens assumes one of two forms. In the one it is almost triangular; in the other lanceolate. It is twice pinnate, with narrow crowded pinnæ, and pinnules which are blunt and oblong, and cut again into broad rounded serrated lobes, without spinous tips. The stalk is short, very full of scales; and, like the last species, this has a pleasant fragrance, arising from the

minute stalked glands which are scattered over it, though the odour is very different from that of the Mountain Fern. The mid-vein of the pinnules of the Rigid Fern is waved; branched veins issuing alternately from it, each becoming forked almost immediately on leaving the mid-vein. The lower branch divides again, each of the lesser branches running into a segment of the lobe. The upper branch—that is, the branch nearest the top of the frond—bears the circular clusters of fructification about half-way between the mid-vein and the margin, thus forming in an early stage two lines, one on each side of the mid-vein, and parallel with it. The clusters are crowded, and gradually mingle into one mass, each being covered by its lead-coloured kidney-shaped indusium, attached by a short stalk, and which is present at every stage of the plant. This fern grows at some elevation on the limestone mountains of the north of England, and seems almost entirely confined to their neighbourhood. At Ingleborough, in Yorkshire, it is frequent; and on some of the North Lancashire hills it grows in thick, compact masses in wonderful profusion. Mr. Pinder, in writing to Mr. Newman, says—"I met with *Lastrea rigida* in great profusion along the whole of the great scar limestone district, at intervals between Arnside Knot, where it is comparatively scarce, and Ingleborough, being most abundant on Hutton Roof crags and Farlton Knot, where it grows in the deep fissures of the natural platform, and occasionally high in the cleft of the rocks; it is generally much shattered by the winds, or cropped by sheep, which seem to be fond of it." It has been found in abundance in the fissures of limestone rocks near Settle, in Yorkshire, at an elevation of 1,550 feet.

This fern is very similar to the Male Fern, but it differs essentially in not having the lower pinnæ gradually diminished in size. It is also termed *Nephrodium rigidum*.

4. **Male Fern** (*L. filix-más*).—Fronds tufted, twice-pinnate; pinnæ linear-lanceolate; pinnules oblong, blunt, and serrated; clusters of fructification near the central vein. This fern possesses the great charm of commonness. We find it in green lane, on open heath, and beneath the shadowy boughs of the woodland. Like the daisy, it stands connected with the pleasant reminiscences of early days, when we gathered its plume-like fronds to form a stay to the more fragile nosegay of wild flowers, which we bound against its firmer green leaf. We may see the handsome fronds of the Male Fern in almost all our country walks in summer, and often do they vary the more barren landscape of winter. It would be likely enough to be one of the ferns to which Nicolls alludes:—

"An ell-lang wee thing, there I ran
Wi' the ither neebor bairns,
To pu' the hazel's shinin' nuts
An' to wander 'mang the Ferns:
An' to feast on the bramble-berries brown,
An' gather the glossy slaes
By the burnie's side; an' aye sinsyne
I hae loved sweet Orde' Braes."

The tall fronds of the Male Fern, two or three feet in height, are of a delicate, somewhat pale green, and grow in circular clumps. In April the young fronds are very pretty, curled round into circles and protected from

Lastrea rigida.

RIGID LASTREA.

early rains and winds by the shaggy scales, which, in their more advanced stage, clothe the lower part of the stalk in abundance, gradually lessening in size and number towards the higher portion of the frond. Their green sprays are fully open by the time that the hawthorn-tree is decked with its snowy wreaths of May flowers; but if the spring has been cold, many a young shoot was nipped by the winds, though, as several survive, and many new ones make their appearance later, the midsummer sun shines on their luxuriance, while their masses of fructification of rich rust-brown colour lie on their under surfaces. The fronds are generally about ten or twelve in a circle, and most are fertile; though in some clumps of the plant all prove barren, and then they are of a fuller green tint, and often taller and broader than the fertile leaves: in no case, however, is the Male Fern of a deep dark green hue. The frond is broadly lanceolate, but slightly narrowed downward, and may be described as twice-pinnate, though the upper portion of the frond is pinnatifid, and, in the pinnæ, those pinnules only which are nearest the main stem are quite distinct from each other. All the pinnæ are slender and tapering, the pinnules of a bluntly oblong form, and serrated at the edge; and all, except the lowest ones, united to each other at the base. The mid-vein of each pinnule is slightly winding, having alternate lateral veins, either simple or forked, or dividing into three branches at different parts of the pinnule. On the branch which is towards the topmost part of the pinnule the fructification is placed in circular clusters, and these form a line down each side of the mid-vein, even with it, but a little distance from it. The clusters long retain the indusium, which is distinctly visible. It is kidney-shaped, lead-coloured, and attached to the vein just at the point where the stalks of the capsules are situated.

This species, like others of its kindred, has been included in various genera, but it has always retained its specific name of *filix-más*. It was very early called Male Fern in this and several of the continental countries; and Gerarde describes it by that name, which was probably given because its habit is more robust than that of the graceful Lady Fern. It grows throughout Europe, and is of old renown, not alone for its supposed medicinal virtues, but because connected with various superstitious practices. Gerarde, who praises the plant for its efficacy in several maladies, quoting also from Dioscorides, adds that the "root hereof is reported to be good for them that have ill spleenes; and being stamped with swine's grease, and applied, it is a remedy against the pricking of the reed." An old notion prevailed that this fern had an antipathy to the reed, just as ivy was fancied to have an antipathy to the vine. Tragus said that the Male Fern and the reed would not grow together, and that where one grew the other was sure to be absent. Later herbalists tell also how the roots of this and the Lady Fern boiled in oil made "very profitable ointments to heal wounds." The green leaves were recommended to be eaten as a cure for some disorders; and an old writer says, referring to this plant: "Fern being burned, the smoke thereof driveth away serpents, gnats, and other noisome creatures, which in fenny countries do, in the night time, trouble and molest people lying in their beds with their faces uncovered." The use of this plant as a medicine, was at one time patronised by the French Government, and this fern has

recently been used in our country by physicians. The astringent roots are employed in the preparation of leather. The young scroll-like fronds were formerly called Lucky Hands or St. John's Hands, and were believed, in days of darkness, to protect the possessor from all the ills of magic, the evil eye, or witchcraft. The old German name of the fern, *Johannis wurtzel*, reminds us of the usages common not alone in continental countries, but also in our own land. Not only was the yellow St. John's-wort dedicated to St. John the Baptist, and burnt on Midsummer Eve, in the fires raised in honour of the saint, but the delicate fern was duly gathered then, and sold to the credulous, who wore it about their persons, and mingled it in the water drunk by their cows. In Norway this plant is used as fodder for horses and cattle, and, when dried, it makes a good litter for these animals. The plant grows in shady places throughout Europe, and seems to have been used medicinally by Theophrastus and Galen.

The underground stem of this fern forms a turfy or tufted head several inches in diameter, and the dark brown fibrous roots are very strong and tough. The stipes and rachis are sometimes smooth and yellow, or more usually densely clothed with pale purple scales. A handsome variety (var. *incisa*), very similar to the common form of the Male Fern, but larger, often attains the height of four, or even five feet. Its pinnules are longer and more pointed, and their edges more deeply cut, the lateral branches of veins more numerous, and the clusters extending over a larger part of the pinnule. A stunted variety, about a foot high, in which the pinnules become rounded lobes, and the fructification is diminished so as to form a line only on each side of the mid-vein of the pinnæ, is called *L. abbreviáta*. The former variety is not infrequent; the latter is found rarely, in woods and on banks in Cumberland and Yorkshire. A very singular form of this fern is sometimes seen, in which the points of the pinnæ spread out into a kind of fringe, so that the top of the frond looks like a tassel. A similar change occurs also in the Lady Fern and in several other of our British species. A remarkable variety, termed *borreri*, was discovered by Mr. Borrer, in Devonshire, and seems not uncommon. It has a narrow lanceolate frond of a golden yellow colour, and bright yellow scales on the rachis.

5. **Triangular Prickly-toothed, or Recurved Fern** (*L. fœnísecii*).—Frond curved, triangular, twice pinnate; pinnules pinnate, or deeply pinnatifid; indusium jagged at the edge. This is a beautiful and well-marked fern, having its frond very minutely divided. Its peculiarity consists in having the margins of its segments all curled upwards, rendering their upper surface concave, and not, like those of several other ferns, rolled beneath. It rises in circular clumps, and its fronds droop most gracefully, forming concave arches. They are about one or two feet in length. This fern grows in warm shady woods, sometimes close by the stream or waterfall; at others, at a little distance from it. Occasionally we find it on exposed rocks, but it is not so luxuriant there as in the recesses of the greenwood. It has, when bruised, a very pleasant odour, and is sometimes called Hay-scented Fern. Its triangular frond, broadest at the base, is twice pinnate; the lower pair of branches being not only longer, but broader than the rest, and very distinctly stalked. The pinnules on the lower side of the

MALE FERN
Lastrea filix mas

Pl. 289.

pinnæ are longer than those of the upper. The pinnules are of oblong egg-shaped form, the lowest often much lobed, and the lobes mostly running close together, so as to form a wing, though they are sometimes shortly stalked. Their margins are serrated, and have spinous points. The stalk is about half the length of the frond, and thickly beset with small, torn, pale-brown scales.

The pinnules have a winding mid-vein, from which issue two alternate branches, and these send off branches of lesser veins, the lowest of these on the side towards the point of the pinnules being the receptacle, or spot on which the clusters of fructification are placed. These extend almost all over the under surface of the frond, forming two lines along each pinnule or lobe. The clusters are circular, and partially covered by the indusium, which is kidney-shaped, often of a lead colour, with the margin uneven or jagged, and set round about with small glands without stalks. The whole plant is covered with minute glandular bodies, giving it a peculiar fragrance. The frond is of beautiful rich green hue, and its woody stalk is of dark purple colour. This fern is the *Lastréa recúrva*, the *Nephrodium æmulum*, or the *Nephródium fœnisecii* of botanists, and is also by some regarded as a variety of *L. spinulósa*. It is abundant in Ireland and the western counties of England, and found more or less in hilly districts throughout the kingdom.

6. **Crested Fern** (*L. cristáta*).—Fronds lanceolate and pinnate; pinnæ deeply pinnatifid; segments acutely and doubly serrate. This fern is found among the ling and heaths of boggy lands, and is much sought for on account of its rarity, though it is less attractive in appearance than many other species. It occurs in Renfrewshire, and is found at Bawsey Heath, near Lynn; at Fritton, and Dersingham, and Edgefield, in Norfolk; on Woolston Moss, near Warrington, Lancashire; on Oxton Bogs, Nottinghamshire; on Wybunbury Bog, in Cheshire; and a few other similar localities. It has a thick underground stem, branching in various directions, from which, in May, the narrow fronds rise, always in most remarkably erect form, narrowing towards the upper part, though being rounded and not pointed at the top. The frond is about two feet high, the stalk being rather more than a third of the length of the whole frond, and having towards its base a few chaffy, bluntly egg-shaped scales, which are always of pale brown colour. The pinnæ of the frond are narrow and triangular in their outline, those at the base being the broadest, the upper ones becoming gradually narrower, but all of the same general shape. They are deeply pinnatifid, each segment attached by the whole of its base, and connected by a widening of its base to the segment behind it. When the frond attains a greater luxuriance, the pinnæ become longer, their pinnules more remote, and the margins of the lobes of the pinnæ have rounded notches.

The mid-vein of the lobes is winding, the lateral branches being again divided into several branches, that nearest the upper end of the lobe bearing the circular clusters of fructification, which are thus seated about half-way between the mid-vein and the margin, and generally found only on the upper part of the frond. A flat kidney-shaped indusium covers the clusters, and its margins, though uneven, are not torn. The fructification is matured in August and September, soon after which the fronds perish by the frost.

A fern which is so nearly allied in some points to this species, and in others to the characters of *Lastréa spinulósa*, that it might be regarded as a variety of either, is sometimes termed *Lastréa uliginósa*. It grows on the boggy heath, and is occasionally the companion of the two species which it resembles, but it is a rare plant. It is similar to the Crested Fern while young, in the form of its half-developed fronds, though when fully grown it looks more like *L. spinulósa*. It has two kinds of frond. The fertile fronds are nearly erect, and form somewhat circular clumps about two or three feet high. The barren fronds are narrower, not so erect, and taper at the summit into a very long narrow form; the pinnæ, too, are narrow and tapering, with oblong-pointed pinnules, rather deeply notched at their margins, each serrature being tipped with a fine hardened point.

The mid-vein of the pinnules is somewhat winding, with side-veins branching from it; the lowest branch on the side towards the apex of the pinnule bearing a cluster; the clusters forming two lines down each pinna.

7. **Narrow Prickly-toothed or Crested Fern** (*L. spinulósa*).—Fronds linear, nearly erect, lanceolate, twice pinnate; pinnules pinnatifid; indusium persistent. This fern is frequent in well-wooded districts, growing beneath the green shadow of the trees, or in spots rendered damp by the streams which wander through the wood. It is about three feet in height, nearly erect, and narrow. It is twice pinnate; the pinnules nearest the stalk being larger than the upper ones, and thus giving a tapering form to the pinnæ. The pinnules are oblong, somewhat narrowing upwards, their edges deeply cut, and the lobes serrated with spiny points. It is, however, only the lowest pinnules on the lowest pinnæ which are thus lobed, those towards the top of each pinna, as well as those nearest the base of the pinnæ at the upper part of the frond, being scarcely lobed, or not lobed at all, though still serrated and spinous. A few broad, roundish, almost transparent scales clothe the stipes. The veining is very similar in all these allied ferns. A slightly winding mid-vein runs through the less divided pinnules, giving off branched veins. The clusters of spore-cases are placed upon the smaller veins, which issue from these branches about half-way between the rib and the margin, generally forming two lines on each pinnule. The same mode of veining is found in the more divided pinnules, the smaller veins being more numerous. Kidney-shaped indusia, with uncut margins, cover the clusters. This species is by many writers considered but a sub-species of the following, or *vice versâ*. It is also the *Aspídium spinulósum* or *Nephrodium spinulósum* of other writers. The sub-species *L. remotum* appears to be mid-way between this and *L. filix-mas*. It is distinguished by having the stipes clothed with lance-shaped scales of uniform pale brown colour, from the base to the rachis, and the lower pinnæ somewhat distant. It has been recorded from Windermere, and has at times been regarded as a distinct species.

8. **Broad Prickly-toothed or Buckler Fern** (*L. dilatáta*).—Fronds arched, lanceolate or triangular, twice pinnate; pinnules pinnate or pinnatifid indusium kidney-shaped. This pretty fern, which is one of the most compound of our native species, is usually about two or three feet in height Its luxuriance, however, depends greatly on the spots on which it grows, and it sometimes attains the height of five feet, becoming under these circum-

CRESTED FERN
Lastrea cristata.

Pl. 290.

stances more branched, and acquiring a deeper green hue. Several species of *Lástréa* grow upright, or nearly so, but the fronds of this fern fall into graceful arch-like forms. The outline of a well-grown and luxuriant frond is egg-shaped and lanceolate, varying to a narrow lanceolate figure, and in young or half-starved specimens becoming short and broadly triangular. The stalk, which is much thicker at the base than in the upper part, is clothed with long pointed scales, which are in the middle of dark brown colour, but are clear and paler at the margins. The twice-pinnate frond has narrow pinnæ; the pinnules at their base being often so deeply divided as to be again pinnate; while the others are pinnatifid, except at the upper parts, where they are merely toothed. The margins of all are serrated and spinous.

The mode of veining is similar to that of *L. spinulósa*, and the fronds produce a large number of clusters of fructification, which, at first sight, seem to be irregularly scattered. They do not lie in such precise rows as on some other species, but they form two lines crosswise to the pinnæ on the larger lobes, and lengthwise on the less divided portions. The indusia are more or less fringed at the edges with stalked glands.

The short triangular form of this fern is not uncommon on exposed places; it is generally of a darker green, often tinged with brown, and the fronds are convex, or even drooping. A variety (*collina*) found on the hills of Westmoreland, Yorkshire, and Lancashire, differs so much from the ordinary condition that some writers describe it as a distinct species. The frond is egg-shaped, very long, and tapering; the pinnules egg-shaped, blunt, and with a broad attachment at the base. They are serrated and spiny, though less so than in the ordinary condition of the plant. In another form the surface of the frond is covered with glands, and the scales of the stipes are broader.

This Broad Prickly-toothed Fern is a very common plant throughout the kingdom. Its rhizome is often conspicuous above the ground, as it does not creep nor send out branches, but becomes a strong firm base, rising erect like a stem, sometimes half a foot above the surface of the ground. This fern is found mostly on wooded or bushy spots, where it is sheltered from the strong sunlight:—

"The feathery fern! the feathery fern!
It groweth wild, and it groweth free,
By the rippling brook, and the wimpling burn,
And the tall and stately forest tree;
Where the merle and the mavis sweetly sing,
And the blue jay makes the woods to ring,
And the pheasant flies on whirring wing,
Beneath a verdurous canopy.

"The feathery fern! the feathery fern!
An emerald sea it waveth wide,
And seems to flash, and gleam, and burn,
Like the gentle flow of a golden tide;
On bushy slope or in leafy glade,
Amid the twilight depth of shade,
By interlacing branches made,
And trunks with lichens glorified."

There are numerous natural varieties of this fern.

6. Shield Fern (*Polystichum*).

1. Rough Alpine Fern or Holly Fern (*P. lonchítis*).—Fronds rigid, simply pinnate; pinnæ not lobed, serrated, spinous, eared at the base. The plants of this genus are nearly allied to those of *Lastrea*, yet they are truly distinct, a most marked feature of difference being in the form of the indusium which covers the seed-clusters. This is circular, and not kidney-shaped, and is attached by a small stalk at the centre. The Polystichums, too, are more rigid in texture than the Lastreas, and more spinous.

We have not many ferns growing on high mountains exposed to the bleak winds; yet the Holly Fern, like the plant from which it takes its name, thrives well on alpine heights, and, indeed, is found only in such situations.

Very beautiful specimens are gathered from the Clova Mountains, where this evergreen plant presents a beautiful appearance as it springs out from the rocky crevices; and it is extensively distributed on the Scottish mountains, as well as in the north and west of Ireland. A few rocky hilly places in the north of England are named as its localities, as Falcon Clints, Teesdale; Mazebeck Scar, Durham; and Langcliffe, near Settle; Giggleswick, and some other places in Yorkshire. It grows on Snowdon, on heights which the traveller hesitates to climb, thriving even on the loftiest summits of the mountain. It is, however, among the shady clefts of the broken masses of rock, at a less elevation, that this fern attains its greatest luxuriance. In some damp and shady spots among these acclivities it is sometimes a foot and a half high, though in ordinary cases the plants are not more than half a foot in height. The stalk of the frond is very short, and the dark glossy green leafy part is mostly leathery, firm, rigid, and sufficiently prickly to remind us of the holly, but it is occasionally thinner and less upright in growth. The young fronds appear early in spring, among the yet verdant fronds of the former year. They rise in a tuft from the extremity of a scaly rhizome, and their outline is narrow, linear, and tapering at the upper part. They are pinnate, with short, crowded, overlapping, twisted pinnæ, which are somewhat crescent-shaped; the upper side having at the base an ear-shaped projection, while the lower side has the appearance of having had a piece cut out. The veins are twice or thrice branched, reaching nearly to the margin, without uniting with others. The indusium is a membrane-like scale, and the clusters of fructification form a continuous line on each side of the mid-rib, and even with it. They are often very numerous on the upper pinnæ.

The Holly Fern is very difficult of cultivation. It is called by some writers *Aspídium lonchítis*, Aspidium being the name of the entire genus, but the British species belong to the section *Polystichum*.

2. Common Prickly Fern (*P. aculeátum*).—Fronds rigid, linear, or lanceolate, twice pinnate; pinnules acute, running down the stem. This is quite a common fern, one which is found almost throughout the kingdom on hedge-banks and shady places, its dark green and handsome fronds contrasting with the brighter tinted Hart's-tongue Fern, or the feathery grasses beside it. It grows also in woods, but is seldom seen on the open heath, or alpine

TRIANGULAR PRICKLY-TOOTHED FERN. Lastrea Bonisecii

Pl. 291.

hill. It is a conspicuous plant, its fronds growing in circular clumps, and often two feet long. They are at first nearly upright, but when fully grown they spread out like a coronal from a thick tufted stem. They are lanceolate in form, and when luxuriant are broad, but their outline varies much in different situations, and often even in plants of the same tuft. The texture is rigid, the stalk usually short, and thickly clothed with membranous scales of a rust colour. In April and May the fronds are some of the prettiest of the green things of the hedgerow, their pale green scrolls drooping downwards in most elegant forms. By midsummer these are fully developed, while, by the middle of August, the upper part of the fronds is usually profusely crowded with dark masses of fructification, and neither summer's sun nor winter's frost seems to tinge their full dark green hue with a tint of decay. They are twice pinnate, their pinnæ alternate, and again divided into pinnules, which run down closely together, gradually merging into the rachis; or they taper to a crescent-shaped base, and are attached to the rachis by the point of the crescent, the upper base being thus extended into an ear-shaped lobe, and the lower base shaped as if an arched piece had been cut out of it. In young plants the pinnæ are serrated or pinnatifid, or with one or more pinnules distinct. The pinnules have a long spine at their points, and smaller spines down the margin, and a few of the lowest are often slightly stalked. The veins are branched alternately, not uniting, but free to the margin. The clusters of fructification form a line on each side of the mid-rib of the pinnules, and on the larger pinnules on each side of the mid-vein of the ear-shaped lobes.

A sub-species of this fern, called *P. lobatum*, was formerly regarded as an entirely distinct species. It is characterized by the more narrow outline of the frond, and by being simply pinnate, its pinnæ lobed or pinnatifid; it is also of more rigid texture.

3. **Willdenow's Fern, Angular-lobed Prickly Fern, or Soft Prickly Shield Fern** (*P. angulare*).—Fronds lax, drooping, lanceolate, twice pinnate; pinnules distinctly stalked, bluntish. This beautiful plant, gracefully waving to every summer wind, is one of the most elegant of our ferns, and happily may be numbered among the common plants of our woods and hedges, though it is not so general as the last species, of which it would probably be better to regard it as a sub-species. It has a very vigorous appearance, is of a deep green hue, and most of the fronds retain their greenness even in winter. The stalk, which is about one-fourth of the length of the frond, is covered with a thick mass of scales of a rust-red colour. The young unfolded plants are, in spring, quite clothed with them, and in the older plants they extend more or less throughout the rachis. Large circular clumps of this fern attract the eye by their beauty of form and attitude, as well as by their large size; for they are occasionally four or five feet in height, though more frequently about two. They have not the rigid aspect of the last species, but are softer and bending. The form of the frond is lanceolate and twice pinnate, the pinnæ being very numerous, long, and tapering in form, distinct, and often distant from each other. The pinnules are flat, somewhat crescent-shaped, sometimes blunt, and sometimes acutely pointed, some of the lower pinnules having deep lobes so as to be pinnatifid.

They are distinctly stalked, and serrated at the margins, a little spine surmounting each serrature. The under surface of the frond is of a delicate sea-green colour, with small, brown, chaffy scales about it. The upper surface is of a deeper hue, but not of a full green tint. The pinnules taper to a broad angled base, and are attached to the rachis of the pinnæ by a short and slender stalk. A very elegant variety, called *P. subtripinnátum*, has its pinnules at the base very deeply lobed; and a form termed *P. angustátum* has all its pinnules narrow and acute.

7. Bladder-fern (*Cystópteris*).

1. **Brittle Bladder-fern** (*C. frágilis*).—Frond lanceolate, twice pinnate; pinnæ lanceolate; pinnules oblong, rather narrowed below, deeply pinnatifid; segments sharply toothed or serrated. This fern, like all the other species of the genus, is fragile and delicate in texture, their membrane-like nature readily distinguishing the Bladder-ferns from most of our native plants. The beautiful little species called Brittle Bladder-fern varies very much in form and in some of its distinctive features, always, however, retaining its fragile nature. Its fronds, which are from five or six inches to a foot high, grow in tufts. The stalk is erect, slender, glossy, of a purplish-black colour, with a few scales at its base. The variable fronds may be generally described as lanceolate and twice pinnate, having in most specimens their pinnules pinnatifid. Owing to their thin texture the veining is very apparent. From a somewhat winding mid-vein a lateral branch runs into each of the lobes; this again branches into smaller veins, almost every one of these bearing a cluster of capsules at about the middle of its length. The cluster, which is of roundish form, has a loose white membranaceous indusium, attached by its broad base at one side only, beneath the cluster. It soon tears into jagged segments, curling under at the part which is jagged, and finally disappears altogether. The roundish form of the indusium in the genera *Lastréa*, *Polystichum*, and the Bladder-ferns, led earlier botanists to include them all in the *Aspidium*, or Shield-fern genus. In *Cystópteris*, however, the indusium is hooded, and not round and flat, and it is also sufficiently like a bladder to have given this name to the plants. The clusters of capsules are at first distinct, but they increase very rapidly, in some cases finally crowding into a mass.

This fern is very widely distributed throughout the United Kingdom, preferring moist rocky places and walls in mountainous districts, and attaining the greatest luxuriance on limestone soils. It forms most beautiful patches of somewhat pale green verdure, springing from rocky crevices, its numerous fronds growing in tufts from its rhizome, and its black and wiry roots penetrating into the clefts. This plant has received much attention from botanists, as it has several forms or varieties, which are, however, intimately connected. That termed *C. angustáta*, which is the most distinct, is, however, by some writers on ferns, considered as a variety of *C. dentáta*. The frond in this variety is oblong-lanceolate, twice pinnate; the pinnules linear lanceolate, more or less forming a wing, acutely pinnatifid or toothed. It is rather longer than the ordinary form, and tapers more towards the point of the frond, and also towards the points of the pinnæ.

NARROW PRICKLY TOOTHED FERN
Lastrea spinulosa

BROAD PRICKLY TOOTHED FERN.
Lastrea dilatata

2. **Toothed Bladder-fern** (*C. dentáta*). — Fronds oblong-lanceolate, twice pinnate; pinnules egg-shaped, obtuse, bluntly toothed. This plant is so similar to the Brittle Bladder-fern that some writers describe it merely as a variety of that plant, but Mr. Babington and several other writers on ferns considered it a distinct species. It is a smaller plant, its pinnæ being more horizontal in form, and all its parts more blunt. Its veining is similar, but the fructification is at the termination and not near the middle of the secondary vein, and is thus more distinctly marginal. The clusters are at first separate, but as they ripen they run into a mass, and form a brown ridge on the under surface of the pinnules. This constitutes a very marked difference between this and the Brittle Bladder-fern. The smooth slender rachis is almost always of a brownish-purple colour.

The Toothed Bladder-fern is not uncommon in the north of England, as about Settle, in Yorkshire, at Cauldron Snout, Durham, and various other localities. It is found, too, near Matlock Baths, on the Cheddar Cliffs, at Tunbridge Wells, and numerous other spots throughout the kingdom where the soil is rocky, though it is probably often overlooked and mistaken for *Cystópteris frágilis*.

A most marked variety of this fern, termed *Dickieana*, has a very compact frond, and is a very beautiful plant, of a deep green colour, and almost transparent texture. The general outline is nearly egg-shaped, but terminating in a point, and the pinnæ are egg-shaped and lanceolate, overlapping each other, the pinnules running closely together so as to form a wing. They are broad and blunt, with a few shallow marginal notches, and the fructification is also marginal. Dr. Dickie discovered this remarkable variety in 1846. He found it growing in a sea-cave near Aberdeen. No other native locality of this plant is recorded, but it is well known to the cultivator of ferns, retaining its peculiarities in the greenhouse or closed case. Its height varies from about four to six inches.

3. **Alpine Bladder-fern, or Laciniated Bladder-fern** (*C. alpína*). — Fronds lanceolate, thrice pinnate; pinnules deeply pinnatifid, partly cloven, and slightly toothed at the end. This plant is the loveliest of this exquisitely beautiful genus. It formerly grew in abundance on an old wall at Low Leyton in Essex, but the only known locality for it now is in Teesdale, Yorks. Sir Wm. Hooker and Dr. Arnott, who examined specimens of the Leyton Fern, pronounced it to be identical with the Continental species. Its fronds, which are very numerous, grow in tufts. They are usually about four or five inches high, but are sometimes twice that height, appearing in May, but, like their equally delicate congeners, dying away with the earliest frosts of autumn. The lanceolate frond is twice pinnate, and the pinnules are often so deeply pinnatifid as to be almost distinct. The branches, which are nearly opposite, with a winged rachis, are egg-shaped, and divided into bluntly egg-shaped pinnules, these pinnules being again cut down almost to the mid-vein into short blunt lobes, which are partly cloven, and slightly toothed at the end. The mid-vein of the pinnules is distinct and nearly straight, with a side vein, either simple or divided, issuing into each lobe, one branch extending to the point of each marginal serrature. Numerous rounded clusters of capsules lie near the margin, covered with

their hooded indusia. The plant is now considered as a sub-species of *C. fragilis.*

4. **Mountain Bladder-fern, or Wilson's Fern** (*C. montána*).—Fronds triangular, thrice pinnate; pinnules of lower pinnæ pinnate; lobes pinnatifid, with linear notched segments. This fern, which is of very elegant form, is among the rarest of all our British species. It is very distinct from the others, and its small triangular very compound fronds are from four to six inches high. It has a slender creeping scaly underground stem, with dark wiry roots. The stalk is about twice as long as the leafy portion of the frond, the pinnæ are opposite to each other, and the lower pair are much longer than the others; these gradually diminish in size towards the upper part of the frond. This plant is exceedingly frail and delicate, almost transparent in texture, and is one of the most compound of our British ferns. The lower part of the frond is thrice, and the upper part twice pinnate, and it has the peculiarity of having the lower side of the lower pinnæ broader than the uppermost side, and some of the upper branches sometimes exhibit this inequality. The lower pinnæ are divided on the lower side into pinnules, which are egg-shaped or lanceolate in form, and these are again divided into pinnules, which are egg-shaped or oblong and notched, the pinnules on the upper side being of the same form as the secondary pinnules of the lower side. In the next pair of branches the lower pinnules are similar to the secondary pinnules of the lower branches, and after that the parts gradually lessen towards the upper portion of the frond.

The mid-vein of the pinnule is somewhat winding, giving out alternate lateral veins, each of which ends in the part of the margin between two notches; at the back of each side vein is placed the roundish capsule cluster, covered by the concave indusium with its jagged edge. The clusters of fructification are very numerous and distinct.

This Bladder-fern is a common plant on many rough and stony grounds of other countries, its geographical range being extensive. It was found on Ben Lawers, in 1836, by Mr. Wilson, when with Sir W. J. Hooker and Professor Graham he visited that spot, and it has since been found in several places on the mountains of Perthshire and Forfarshire, but nowhere in great abundance.

8. Spleenwort (*Asplénium*).

1. **Green Lanceolate Spleenwort** (*A. lanceolátum*).—Fronds lanceolate, twice pinnate; pinnæ egg-shaped and lanceolate; pinnules toothed or lobed; clusters of fructification nearly marginal. This is one of the most elegant of our British ferns, and one of the few which thrive best near the sea. Though not exclusively confined to the sea-coast, it is far more frequent there than on inland soils, and at Penzance, in Cornwall, is one of the most common plants, springing out of every wall, and being as general on the hedge-bank as the primrose. It is abundant at St. Michael's Mount, but nowhere in England grows to so large a size as among the damp rocks of the Lizard Point. It is also luxuriant at Torquay, in Devonshire. Sometimes this fern, like other plants which frequent the sea-coast, flourishes on high mountains, and the botanist has welcomed its green fronds on the heights of

HOLLY FERN.
Polystichum lonchitis.

Snowdon. Some summers since, it grew in profusion on the high rocks at a short distance from Tunbridge Wells; but as that neighbourhood has, by its rare plants, attracted the attention of many botanists, and as fern-lovers are sometimes not so considerate for others as they should be, it became less abundant, and perhaps may be by this time altogether eradicated by the heedless waste with which it was gathered. It is a plant of but local occurrence, even on the sea-coast, growing only on the southern and western coasts of England and Wales, but it is plentiful in the Channel Islands. Its long black wiry roots penetrate far into the fissures of rocks. The young fronds appear in May, are matured by August, and remain green through the winter. The underground stem is brown, tufted, and densely clothed with a mass of bristle-like scales. Similar scales are scattered here and there on the stalk of the frond, which is of a glossy chestnut hue. In the most luxuriant specimens the frond attains the height of a foot and a half, but its average size is from six to eight inches. The outline is lanceolate; the stalk about a third of its length. It is very similar to that of the species next to be described, the Black Spleenwort, but its outline differs in this respect. The form of the Black Spleenwort is always triangular and broadest at the base; but that of the Green Lanceolate species is truly lance-shaped, tapering from near the middle towards the base. The frond is twice-pinnate; the pinnæ are generally, but not always, opposite, and egg-shaped and lanceolate in form. The pinnules are usually inversely egg-shaped, and have the margins serrated with deep teeth; the larger pinnules being cut into toothed lobes.

The pinnules of this fern have a winding mid-vein, the lateral veins are branched, one of the smaller of these branched veins extending to each serrature of the margin, and the fructification being placed near the extremity, but not in a very regular manner. Each cluster of capsules is at first long and narrow, and covered with a linear white indusium. This soon disappears, and the clusters crowd ultimately into roundish masses.

2. **Black Spleenwort** (*A. adiántum-nígrum*).—Fronds triangular, twice or thrice pinnate; pinnæ and pinnules triangular, and sharply-toothed. This is a frequent and ornamental fern, gracing the time-stained walls of many an old church or ruin, or hanging down its graceful sprays over rocks, or on the hedge-bank of the dry but shady lane. It varies somewhat in form under different circumstances; it has generally a very elongated triangular outline, the lowest pair of pinnæ being larger than the others. When growing in dry and open places, it is smaller and more blunt in all its parts than when among the bushes of the shadowed lane. It is among the latest of our ferns in unfolding its fronds, which are often not open till the middle of June. They are at first quite erect, forming little tufts, but they gradually lengthen and curve gracefully downwards, retaining their elegance of shape, and even their green hue and fructification, through the winter. The stalk is purple-brown and glossy, about half the length of the frond, and has upon it small bristle-like scales, which are also to be found on the rachis. This frond has its branches also of a triangular form, pinnate, and the pinnæ alternate, drawn out usually at the top into a long point; each pair gradually lessening from the base towards the top of the frond. The pinnules, too,

are triangular and alternate; the lower being deeply lobed and serrated at the margin.

The fronds of the Black Spleenwort are not crisp and brittle, like those of many ferns, but have a tough and leathery texture, and are much veined. The winding mid-vein of each pinnule is very distinct, and from it issue veins which are either simple or forked; one of these lesser veins extending to each point of the serrated margin, and bearing the cluster of capsules. The same mode of veining is apparent also in the ultimate divisions of the frond, as well as in the larger lobes, and these bear the clusters near the point at which they unite with the mid-vein, so that the clusters are placed near the centre of every pinnule or lobe. In an early state the clusters are distinct, and are long and narrow; but as they mature, they form one dark-brown thick mass, almost covering the whole of the under surface of the frond. The indusium is present only in an early stage of their growth; it is white, and has an undivided margin.

When this fern varies into a much more blunt form, it constitutes the variety called by botanists *obtusum*, which is found growing on serpentine rocks in Aberdeenshire; while sometimes, especially when growing in very shady places, it assumes a more slender and tapering shape, and is called *acutum*; this has been recorded from South-west Ireland. Both these forms are rare in this country, though on the Continent they seem well known, and are considered so permanent that they are sometimes described as species.

It is a common plant on rockwork in gardens, and very well adapted to it; but its fronds do not become large unless it grows in shade. It does not thrive so well in the closed case as in the open air.

3. **Smooth Rock Spleenwort** (*A. fontánum*).—Fronds linear-lanceolate, twice pinnate; pinnæ oblong, somewhat egg-shaped; pinnules wedge-shaped and toothed. This is a very rare fern, mentioned by our older botanists as occurring on places on which it is no longer to be found. It was described by Hudson as growing near Wybourn, in Westmoreland. It also formerly grew on the walls of Amersham Church, in Buckinghamshire. It has of late years been found at Matlock, in Derbyshire, on a very old wall at Tooting, also on a rock at Stonehaven, and more recently by the Rev. W. H. Hawker, growing in some quantity on a very old wall near Petersfield, in Hampshire. It has been regarded as a doubtful native, and this doubt has been made almost a certainty by the fact that it has only been found in such situations as would suggest that it had been planted there at some previous date, or that its spores had been blown thence from garden specimens.

It is not infrequent in Continental countries, in rocky places. This Spleenwort is a very distinct and handsome little fern, its thick rigid fronds growing in small tufts to the height of three or four inches. The upper surface of the frond is deep green, but the under part is of a pale whitish green, and it retains its colour throughout the winter. The outline of the frond is narrow lanceolate, the stalk very short and scaly at the base. It is twice pinnate, the pinnæ being oblong egg-shaped, and the pinnules inversely egg-shaped, somewhat wedge-shaped, tapering towards the base, and toothed

1 COMMON PRICKLY FERN
Polystichum aculeatum.
2 Sub-sp. P. lobatum.

Pl. 295.

at the margin. Both the principal stalk of the frond, and the partial stalk of each branch, have a narrow leafy wing throughout their length. This forms a distinctive feature of the fern.

The texture of this fern is too substantial to allow the veining to be very apparent. The chief vein of each pinnule sends out a branch towards each lobe or serrature, and in the larger pinnules some of these lateral veins become forked, a vein running into each lobe or notch. An oblong cluster of capsules is seated on two or more of these veins, and covered with an indusium of a similar form, waved and indented at the edge. The clusters are rarely distinct, but generally form a brown mass on the under surface of the pinnules.

4. **Wall-rue Spleenwort, or White Maiden Hair** (*A. rúta-murária*).—Fronds twice pinnate; pinnules lobed, or bluntly-toothed. This is a plant often seen and easily recognised. It is a common fern in Scotland, Wales, and Ireland, and is generally distributed throughout England, though less common in the eastern counties than elsewhere. Its native haunt seems to be the rocky hills, where its little fronds cluster above the fissures of the stone; but the wind scatters its dust-like spores, and they find a congenial soil on the stone pinnacle or tower of the ancient church, or on broken archway or brick wall, where we may often find them with their companions the green pellitory, or the golden wall-flower. The plant seems to love the haunts of man, for it is far less frequently found on the wild rock than on the walls which his hands have reared. It grows, however, in luxuriance on the fissures of the rocks about the Peak in Derbyshire, and is abundant on the craggy hills of Arthur's Seat, in Edinburgh. Its fronds, which are thick and leathery, appear in May and June, and by September are thickened by the dark brown mass of fructification beneath. The form of the plant would at once recall to memory that of the common garden rue. The frond is usually triangular, the stalk of a dark purplish-brown colour, slender and glossy; the leafy part occupying rather more than half its length. The fronds are most commonly three or four inches long, but, when most luxuriant, attain the length of half a foot. They are twice pinnate, the pinnules being alternate and pinnate, of a roundish egg-shaped form, bluntly wedge-shaped, and on short stalks, and the colour is either deep dark green, or sometimes of a sea-green tint. When growing on exposed spots, they are covered with sea-green powder. Some of the larger fronds are again divided, and their pinnules cut down nearly to the mid-vein, the lobes having the usual form of the pinnules. Little tufts of this plant, however, may be found in which the fronds are pinnate only, with pinnatifid pinnæ. The pinnules of this fern are like little leaves, each on a stalk, and with the upper margin irregularly toothed.

There is no mid-vein in the pinnules of this fern, but the veins radiate from the stalk towards the margin in a fan-shaped direction, and on them are borne the narrow lines of the clusters of fructification; these are at first covered by a membranous indusium, the free margin of which is jagged and uneven. As the capsules increase in size, the indusium turns back and finally disappears.

This fern is sometimes called *Amésium rúta-murária;* and one of its old

English names, White Maiden Hair, was probably given because of the light-coloured powder sometimes seen on its fronds. It was of old renown among the herbalists as a cure for coughs, and affords a slight degree of mucilage.

5. **Alternate-leaved Spleenwort** (*A. germánicum*).—Fronds simply and alternately pinnate; pinnules narrow, wedge-shaped. This is one of the rarest of British ferns, and is found on rocks in a few places in Scotland and the north of England and Wales. It was formerly considered but a variety of the Wall-rue, but its characteristics seem quite distinct and permanent; and it is more probable that it may prove to be a hybrid between that species and the Forked Spleenwort. The frond, which is about three or four inches high, and of a bright green colour, is long and narrow, and pinnated with distinct, alternate, wedge-shaped pinnæ. The upper pinnæ are slightly lobed, becoming more lobed towards the base; their upper ends are in every case toothed or notched.

The fronds grow in tufts, are thick and tough in texture, and have no distinct mid-vein; but a vein from the base of each pinna, or lobe, branches off two or three times as it reaches the broader parts, the veins forming a fan-like figure, being in the larger pinnæ seven or eight in number, and four in the smaller ones. Two or three lines of fructification are on each pinna, and are covered by an arched indusium, the margin free and slightly waved, but not torn; the clusters finally run into one thick mass. This plant is, by some writers, called *Asplénium alternifólium*. About sixteen natural varieties have been described.

6. **Forked Spleenwort** (*A. septentrionále*). — Fronds 2 or 3-cleft; segments linear; margin sharply toothed. This is a rare fern in this country, though occurring in a few localities in abundance, as among the fissures of the rocks of Arthur's Seat, Edinburgh. It grows, too, on rocks and walls from Perth and Aberdeen southward as far as North Wales, and then occurs again in Devon and Somerset. Mr. Newman says, that he has seen it in greater luxuriance at Llanrwst, near the mouth of the Conway, than in any other place. This plant grows in tufts, and, notwithstanding the diminutive size of the individual fronds, occasionally thus forms large masses. Mr. Newman says, "At Llanrwst, the tufts of this fern were very large; one of them was so heavy, that after shaking out all the loose earth, I found it a very inconvenient load to carry, even the single mile which I had to convey it. This tuft, consisting, I suppose, but of one rhizoma, had upwards of three hundred perfectly vigorous fronds, besides at least an equal number of decaying ones, the relics of the previous year." The fronds are usually two, three, or four inches in length, slender and forked, so as to resemble the horns of a stag; easily distinguished by their shape from any other fern, reminding one of the leaves of that common plant, the buck's-horn plantain (*Plantágo corónopus*). The veins are few and little branched, one running into each lobe. The clusters of capsules lie in lines, in a very crowded manner, on each side of the vein. They are, at first, covered by a linear-shaped indusium, which bursts open as the capsules mature, and then gradually disappears. The whole under surface of the frond is finally covered with the brown mass of fructification.

ANGULAR LEAVED PRICKLY FERN.
Polystichum angulare

7. **Sea Spleenwort** (*A. marinum*).—Fronds pinnate; pinnæ oblong and blunt, stalked, unequal and wedge-shaped at the base. This beautiful fern grows out from the sides, or hangs its numerous sprays down from the summits, of sea-caves, rocks, or cliffs. Its deep rich tufts of evergreen fronds attain, when most luxuriant, the length of three feet, but it varies greatly in size. It is abundant on maritime rocks in the south-west of England, and may be found all along the British coasts, except the south-eastern. It is plentiful in the Channel Islands, as well as on the coasts of Ireland. The specimen from which our illustration was made was gathered from the rocks, on the sea-shore under the Hoe at Plymouth. In Cornwall this fern is often a beautiful object. The frond unfolds in July, bearing its fructification in September and October. Its form is linear, simply pinnate; its pinnæ are stalked and serrated, and connected at the base by a narrow wing, extending along the rachis. The pinnæ are not always alike in shape, some being oblong, others egg-shaped; they are unequal at the base, the side nearest the upper part of the frond being much developed, while the lower portion looks as if a piece had been cut off. The margins have either rounded or pointed serratures. The general appearance of this handsome fern is so unlike any other British plant, that it is easily distinguished. Its upper surface is of a deep glossy green, its under surface is paler. In the greenhouse it attains much greater luxuriance than in its wild state, and away from its natural haunts it needs this protection, for its fronds are quickly destroyed by frost.

The Sea Spleenwort has long been used medicinally. It is somewhat mucilaginous, and was formerly considered a good application to burns. Like all the species destined to grow on rocks, it has tough wiry stems, which penetrate into clefts, and hold the plant so firmly there that it is difficult of eradication. The rhizome is short, and the fronds often grow from it in tufts. The veining may be usually readily seen. Each pinna has a mid-vein, which gives off lateral veins, these again sending off others. The clusters of capsules lie on that side of the lateral veins which is nearest the upper part of the pinnule, forming bright rust-coloured lines, often of an oblong form. These are covered by an indusium, which bursts open as they ripen.

8. **Green Spleenwort** (*A. viride*).—Fronds linear, pinnate; pinnæ alternate, roundish; egg-shaped, wedge-shaped at the base, bluntly serrated. This very pretty little fern varies much in size, according to the situation on which it grows. It is so like the Common Wall Spleenwort that it might at first be mistaken for it, but it may be distinguished by the colour of its slender rachis, which is green, while the stalk of the Wall Spleenwort is throughout of a purplish-black, and by the rounded notches on the margins of its evergreen leaf-like pinnules. This fern is very frequent in the Highlands of Scotland, growing on moist rocks, into whose crevices it sends its wiry fibres. Its hue is brighter and of a lighter green than the other British species of the genus. Though the upper part of its stalk is yellowish-green, yet it gradually deepens in hue towards the lower parts, becoming at its base of a purplish-brown. The stipes is about a third of the length of the whole frond, and the plant grows in tufts. The simply pinnate leafy part is

from two or three inches to a foot long, narrow, and the small roundish egg-shaped pinnæ rather tapering towards the base, and attached to the rachis by the narrow part, which becomes gradually narrower. The veining of the fern is distinct. A number of lateral veins arise alternately from the mid-vein, and are either simple or forked. The capsule clusters lie on the side nearest the top of the pinna; they are oblong, and covered at first by oblong membranous indusia, jagged or notched, which soon fall. The fructification then forms a dark brown mass all over the middle of the under side of the fern, concealing the mid-vein. This fern, which is found in the mountainous districts of England, as far south as Derby and South Wales, also in the west of Ireland, occurs in similar moist rocky places throughout Europe. Linnæus termed it the Branching Trichomanes, because its fronds have a tendency to divide into a branched form.

9. **Common Wall Spleenwort** (*A. trichómanes*).—Fronds linear, pinnate; pinnæ roundish, egg-shaped, stalked, wedge-shaped below. This is one of our most common ferns; and it is a graceful plant when growing, as it often does, in large quantity. Now and then we find its deep green sprays making a light tracery over some sloping hedge-bank, on which the sunshine is not interrupted by overshadowing boughs. More often, however, the old church tower or stone wall is enlivened by its clumps of slender fronds, or they give to the ruin a touch of verdure; and throughout the year we may gather it from some shady rock, its evergreen fronds, when in a thriving condition, becoming a foot in length. The stalk is throughout the frond of a purplish glossy black. The frond is dull green, its small pinnæ are of equal size, very numerous, and in some cases quite distinct, in others closely crowding on each other. They are of a roundish oblong shape, and are attached by a short stalk, wedge-shaped below, and formed as if a piece had been cut off. The pinnæ are jointed at the main stalk of the frond, and when old, fall off and leave it naked, numbers of the black glossy hair-like stalks mingling with the green fronds. A mid-vein in the pinna gives rise on each side to forked veins; and the linear cluster of capsules is placed just within the margin of the pinna, on that vein of the fork which is nearest its upper part. These clusters are, when young, covered by a thin indusium, with its margin free and notched; but as they ripen, they sometimes run into one mass, covering with their dark brown hue almost all the under surface of the pinna, though more frequently lying in two distinct portions, and leaving the mid-rib uncovered.

This fern is not subject to much variation, except that it differs greatly in the length of its fronds according to the place of its growth, and has the frond variously forked towards the apex. A form termed *incísum* has its pinnæ cut into narrow notched segments almost to the mid-rib. This fern is common, not only throughout this kingdom, but throughout Europe. A tea and syrup made of its fronds have long been used as a remedy in pulmonary affections.

9. Lady Fern (*Athýrium*).

Lady Fern (*Athýrium filix-fœmina*). — Frond lanceolate, twice pinnate; pinnules deeply cut or pinnatifid; lobes sharply toothed. This

1. TOOTHED BLADDER FERN.
Cystopteris dentata.

2. DICKIE'S F.
C. dickieana.

Pl. 298.

fern, whose graceful attitude and elegant outline won for it its distinctive name, is indeed the loveliest of all our larger ferns. It grows abundantly in many sheltered and moist woods, attaining there its greatest luxuriance, and its somewhat pale green fronds arising in such places to the height of three or four feet. It may often be seen, too, gracing spots of another character, for the slopes of grassy hills are not without its clumps.

Walter Scott, alluding to this plant in "Waverley," mentions its love for the moist shady woodlands :—

> "Where the copsewood is the greenest,
> Where the fountain glistens sheenest,
> Where the morning dew lies longest,
> There the Lady Fern grows strongest."

Calder Campbell, too, in some lines which he has written for this volume, well describes such a spot as the Lady Fern delights to haunt—

> "If you would see the Lady Fern,
> In all her graceful power,
> Go look for her where the woodlarks learn
> Love-songs in a summer bower ;
> Where not far off, nor yet close by
> A merry stream trips on,
> Just near enow for an old man's eye
> To watch the waters run,
> And leap o'er many a cluster white
> Of crowfoots o'er them spread ;
> While hart's-tongues glint with a green more bright,
> Where the brackens make their bed.
> Ferns all—and lovely all—yet each
> Yielding in charms to her
> Whose natural graces Art might teach
> High lessons to confer.
>
> "Go look for the pimpernel by day,
> For Silene's flowers by night ;
> For the first loves to bask in the sunny ray,
> And the last woos the moon's soft light :
> But day or night, the Lady Fern
> May catch and charm your eyes,
> When the sun to gold her emeralds turn,
> Or the moon lends her silver dyes.
> But seek her not in early May,
> For a Sibyl then she looks,
> With wrinkled fronds that seem to say,
> 'Shut up are my wizard books !'
> Then search for her in the Summer woods,
> Where rills keep moist the ground,
> Where foxgloves from their spotted hoods
> Shake pilfering insects round ;
> Fair are the tufts of meadow-sweet
> That haply blossom nigh ;
> Fair are the whorls of violet
> Prunella shows hard by ;
> But not by burn, in wood or vale,
> Grows anything so fair
> As the plumy crest of emerald pale,
> That waves in the wind and soughs in the gale,
> Of the Lady Fern, when the sunbeams turn
> To gold her delicate hair !"

The Lady Fern is very generally distributed throughout England, and is still more common in Ireland, where it abounds on almost all the bogs.

Its vertical distribution is also wide, for it extends from sea-level to a height of 3,000 feet, where it usually assumes the form known as var. *rhæticum*. The light and arrowy fronds arise in circular tufts from the rhizome. This is very large, extending itself some inches above the surface of the earth, and forming a base to the slender fronds. During early spring, when we wander into the woods for violets and primrose buds, we see numbers of little undeveloped fronds coiled up and thickly covered with their light brown scales, peeping from among the decayed leaves, which will soon be swept all away by the spring breezes. By the end of April, when the primrose needs no longer to be searched for, these little scrolls are unfolding too, and then they hang down, forming the figure of the shepherd's crook, a dozen or more of the young fronds often in one clump. They live throughout the summer, towering above the hedge or woodland flowers, but they cannot bear the frost. There are several varieties of the Lady Fern. In the common form the lanceolate frond has a stalk usually about a third of its whole length, and scaly at the base. It is twice pinnate, the pinnæ being lanceolate and generally tapering. These are always again pinnate, the bases of these pinnules being sometimes connected by a narrow wing. The pinnules are lobed, often so deeply cut as to be pinnatifid, and the lobes are sharply toothed. The veining of this fern is very distinct. A mid-vein winds through each pinnule, alternate smaller veins arising from it, and these being again branched in an alternate direction. On the lowest branch, on the side nearest the top of the pinnule, about midway between the mid-vein and the margin, is the oblong slightly-curving cluster of capsules, covered by the indusium of the same form. Both the cluster and its covering, on the maturity of the capsules, contract at the ends and swell in the middle, thus becoming more curved, and assuming a more roundish form than in an earlier stage; the indusium also is then kidney-shaped. On one side the indusium is attached to the side of the vein on which it is seated; while on the other side, that which is towards the mid-vein, it becomes free, and is torn at the edge into thread-like segments. The fructification is so abundant, that Sir J. E. Smith has remarked of this fern, "if a single plant were uninterrupted in its possible increase for twenty years, it would cover an extent equal to the surface of the whole globe." In Ireland, where it is common on all the bogs, this fern is used for packing fruit, as we in England use the common brake. It is sometimes used also by fishermen, for Mr. Newman remarks of the plant, "On landing at Warren Point, near Newry, I was rather surprised to see what quantities of it were employed in packing the herrings there exhibited for sale."

This is a most variable fern, and certain of its many varieties have been regarded by some botanists as permanent, and so distinct as to deserve to be classed as species. The variety *A. latifólium* is one of these. It is a much less delicate plant than the ordinary form. Its frond is lanceolate, somewhat oblong; its pinnules are broad, leafy, and set more closely together, lobed and deeply toothed at the edges, with the curved clusters of capsules lying near the hollow between two lobes. It has been found near Keswick, in Cumberland. It is probable that it only acquires its peculiarities from the situation in which it grows.

1. MOUNTAIN BLADDER FERN.
Cystopteris montana

2. ALPINE B. F.
C. al

Pl. 299.

The variety termed *A. rhœticum* is very distinct. It has more slender, twice-pinnate fronds than any other form of the Lady Fern, and its pinnæ and pinnules are smaller. The narrow lanceolate frond is erect, and rarely more than two feet high; the pinnæ are taper pointed, and the very narrow pinnules end in a sharp point. Their edges, which are somewhat bluntly toothed, are rolled under so as almost to hide the serratures.

The variety *A. molle* has a short stalk, with broad and short scales. The frond rarely exceeds a foot in height, and is usually erect, and of a bright green colour. Its outline is egg-shaped and lanceolate. It is pinnate, having its lower pair of pinnæ short and turning downwards. The pinnules are flat and toothed, and connected at their base to the mid-rib by a narrow wing. The clusters of fructification are distinct.

Other forms are produced by culture, some of which are very singular. Thus the variety *multífidum* has the tips of the frond and of the branches cut into numerous segments so as to form a tassel. This, too, is the case with a dwarf variety called *crispum*, which, with its tasselled fronds, looks in the closed case like a clump of parsley. This form was first found on Orah Hill, Antrim, Ireland, and has since been gathered from Braemar, in Scotland. Some of these varieties, both natural and cultural, produce a vast number of little bulbils on their fronds, by which the plant may be propagated with ease. The Lady Fern was formerly called *Polypódium fílix-fœmina*, and later botanists have termed it *Asplénium fílix-fémina*, *Athyrium* being but a section of the genus *Asplenium*.

10. Scaly Spleenwort (*Céterach*).

Common Ceterach, or Scaly Spleenwort (*C. officinárum*).—Fronds linear-lanceolate, pinnatifid, covered beneath with chaffy scales; segments blunt. This fern is readily distinguished from any other British plant. It varies very little in form, and the whole of its under surface is thickly clothed with brown scales. The fronds are from two or three to six inches long, very thick, tough and leathery, the upper surface of a dark green hue, slightly downy, and having a brown edge, in consequence of the projection beyond the margin of the scales which are beneath. The outline is long, narrow, very deeply divided into rounded lobes, which are often again notched or cut into segments, and they stand in an oblique position towards the mid-rib. The whole of the under side is of rich brown colour from the dense mass of scales, and the short stalk is also scaly.

The thick texture of the Fern renders the veining indistinct, and it can only be seen in the young fronds, which appear in May. A vein enters from the lower corner of the lobe, winding towards the top; the lateral veins branch in an alternate direction; and these are again forked towards their summits, crossing each other somewhere near the margin. The sori lie along the sides of these forked veins in a very regular manner, being at first quite hidden by the scales, but afterwards standing up distinctly from them, though, being brown and chaffy like the scales, the two are easily confounded except by a close observer.

The short tough roots of this fern insinuate themselves effectually into the crevices of walls, and the tufts of Scaly Spleenwort are not uncommon on

ruins and ancient castles and churches, as well as on rocky places, especially in limestone districts, in England and Ireland; but the plant is found chiefly in the western half of England and Scotland; also in Wales, Ireland, and the Channel Isles. A variety found in the English Lake-district, in Devon, Perthshire, and Waterford, has the edges of the lobes crenately toothed; it is therefore styled *crenatum*. The old Arabian writers said much in praise of its worth in complaints of the liver and spleen, and our herbalists eulogize its efficacy as an outward application to wounds. It appears to be the true Spleenwort of the ancients, and the plant to which they attributed so great an effect in disorders of the spleen. The Cretan swine, when feeding upon it, were said to lose that organ altogether, and it was believed that, when taken to excess, the same injury was experienced by the human constitution. Is has of late years been recommended as a good medicine in cases of jaundice. The fern is evergreen, and it grows to a much larger size in warmer regions than in our country. It seems, however, to be the same plant, owing its luxuriance to the climate. The author has seen a specimen of a Scaly Spleenwort (*C. aureum*) brought from Madeira, in which some fronds of the tuft were fourteen inches long, though our native fronds are usually about three or four inches in length. During periods of hot dry weather the fronds of this fern become so shrivelled as to appear dead, but on the return of rain they at once become plump and fresh again. *Ceterach*, like *Athyrium*, is now generally regarded as a sub-genus or division of *Asplenium*.

11. Hart's-tongue (*Scolopéndrium*).

Common Hart's-tongue (*S. vulgáre*).—Fronds oblong, strap-shaped, simple; base heart-shaped. To those accustomed to wander about our green lanes and fields, no fern will less require a minute description than this. Its general features are known not alone to the botanist, but to every observer of plants, and it varies, under any circumstances, too little from its ordinary form to make it difficult of recognition. Its clumps of long, slender, bright green leaves, with a surface so glossy that the rain-drop runs off them, gather on sunny hedge-banks in almost every rural district of our land, and are still more often to be found on the moist and shady sides of woods, among the long grasses, or coarse herbage, or the tall stems of wild flowers. The clumps are circular, the fronds spreading out from the centre, and gracefully curving downwards. In May, when the hedges are full of blue-bells, and anemones, and rosy cranesbills, the young fronds may be seen daily uncoiling somewhat further, till all traces of their scroll-like form are lost, save a little curl at the tip of the frond, which in a few days is levelled too, and the pale green colour of the young frond gradually assumes its richer verdure. In June and July the Hart's-tongue Fern is very bright and beautiful, of a delicate and tender green, quivering before the rough winds, but of too firm a texture to be stirred by a light summer's breeze. The frond is long and narrow, tapering and acute at its upper end, and again gradually narrowing at the base, when it becomes very distinctly heart-shaped. Its margin is entire and waved, the leafy portion being placed on a short and shaggy stalk, which is of a purplish-brown colour at the base. While the frond is young, it has a downy or cottony substance on its under side, and often also on each side of

LANCEOLATE SPLEENWORT.
Asplenium lanceolatum.

Pl. 309.

1. BLACK SPLEENWORT.
Asplenium adiantum-nigrum

2. SMOOTH ROCK-S.
A. fontanum.

the mid-rib on its upper surface. The length of a full-grown frond is from six to thirty inches. It grows very luxuriantly on stone walls, at the borders of streams, or the sides of wells, and is sometimes found in mines or caverns. It is by no means a mountain fern, for it is not known at greater elevations than about 600 feet.

Sir J. E. Smith says of its fronds: "In the now open vault by the great hall in Conway Castle, I have gathered them upwards of three feet long, and nearly five inches wide." Sir W. J. Hooker found them in the moat at Kenilworth Castle more than two feet long. A very stout and strong mid-rib runs through the leafy part, from which forked veins arise, the smaller veins being parallel to each other, and running towards the margin, but ending just within it. Oblong clusters of fructification, some long and some short, lie in the direction of the veins, at short intervals, on the upper part of the leaf, occupying about two-thirds of its length. They are placed in oblique parallel lines on each side of the mid-vein, and when seen in their ripened state appear to be single. If these are examined when young, they may, however, be seen to be composed of two distinct patches, facing each other, and divided by a small line, which is finally hidden by their uniting into one mass. Each of the lines consists of a complete cluster, and when joined together this is called a twin-sorus. This twin-sorus is always placed between two bundles of veins, and covered by the thin white membrane-like indusium of the same form as the clusters. In an early stage, the indusia, touching each other, seem like one only; then they separate slightly, the distinction between them becoming daily more apparent, till they finally become widely separated and fall off.

This plant was considered of some medicinal use by our forefathers, and was included in what were termed the five "capillary herbs." The golden or common polypody, the common maidenhair, the common spleenwort, the wall-rue, and Hart's-tongue, formed this group, which was in early days held in great esteem.

The Hart's-tongue offers an enormous number of varieties, especially when cultivated, as it so often is, on rockwork. A very elegant and common variety, termed *crispum*, is so waved and curled at the margin, that it becomes a leafy frill on each side of the mid-rib; it is often of a much paler green than the common form of the Hart's-tongue. Another well-known variety is that termed *polyschides*, in which the frond is narrow, linear, deeply and irregularly cut at the margin into roundish lobes. A third variety, *lobátum*, has its fronds strap-shaped below, widening at the upper part, and there cut into two or more acute lobes; and a very beautiful variety, *multifidum*, has its fronds strap-shaped below, spread out at the upper part, and cut into crowded, more or less blunt, and wavy lobes. A fourth variety is very remarkable, and has been found on a wall near Taunton and at Strabane; it is termed *lacerátum*, and has its broad fronds deeply lobed or pinnatifid. The cultivated varieties are well-nigh endless, and some of them are very remarkable.

Some forms of this fern are found, when under culture, to be viviparous: that is, buds arise upon the stem, which separate spontaneously from the plant itself, and become young ferns. A variety of *Polystichum angulare*

has been for some time known as viviparous, but from recent observations it would seem that the same peculiarity is observable in several of the British Ferns.

12. Hard Fern (*Blechnum*).

Northern Hard Fern (*B. boreale*).—Barren fronds pinnatifid, pinnate towards base, with broad blunt segments; fertile fronds pinnate, with narrow acute segments. Our only native species of this fern grows in handsome clumps, attracting the notice of the lover of plants by the marked difference between the barren and fertile fronds which spring from the same roots. It is by no means a rare fern; and many a rambler, intent on forming a wild nosegay, gathers its bright evergreen leaves to mingle with his bunch of ling, or heath flowers, or "bonnie broom." Cowper had, perhaps, admired this among the ferns which grew on such spots as he describes in his rambles:—

> "The common overgrown with fern, and rough
> With prickly gorse, that shapeless and deformed,
> And dangerous to the touch, has yet its bloom,
> And decks itself with ornaments of gold."

But though this beautiful fern luxuriates especially on moist boggy lands, it is not confined to such localities; it grows also in woods and on banks, particularly such as are rendered moist by streams or pools, and where the soil is of sand or gravel. It ascends the mountain to an elevation of 4,000 feet. Though occurring in most counties of the kingdom, yet it is somewhat local in its haunts, and not always to be found where we should soonest have looked for it. It is a fern readily distinguished, the barren fronds spreading more around the spot whence they arise, sometimes being quite prostrate on the ground, and having the pinnæ much closer together than in the taller erect fertile fronds, which are cut into so many slender divisions as to resemble the teeth of a comb; the barren ones having their upper segments only cut nearly to the mid-rib, while the fertile ones are distinctly pinnate. The former are about half, or rather more than half, the height of the fertile fronds, and have short scaly stalks. The fertile fronds, which are about a foot or a foot and a half high, have a dark brown stalk nearly half their length, with long pointed scales upon its surface, and are at once distinguished by their upright growth.

Both kinds of fronds are bright green, and their veining is similar, except that in the fertile frond a long vein runs down each side of the mid-rib, and on this are placed the lines of fructification. Forked veins run almost to the margin on each side of the mid-vein, and are club-shaped at the extremity. When young the clusters of capsules are distinct, but they afterwards crowd into one linear mass. At an early stage they are covered by an indusium, which soon bursts open at the side nearest the mid-vein. Though growing on open heaths, the plant always seems finest when found under the shadow of bushes. Some authors are of opinion that this plant is not a *Blechnum* at all, and have removed it to the genus *Lomaria*, with the specific name of *spicant*.

The clumps of *Blechnum* are so handsome, among the wild flowers and grasses of summer, that we should be sorry to miss them, though they

1 WALL RUE SPLEENWORT.
Asplenium ruta-muraria

2 ALTERNATE-LEAVED S.
A. germanicum

3 FORKED S
A septentrionale

Pl. 302.

cannot be turned to any economical uses, nor will cattle eat of their crisp leaves. The plant was by old writers called Rough Spleenwort. Gerarde says: "There be empiricks or blind practitioners of this age, who teach that with this hearbe not only the hardnesse and swelling of the spleene, but all infirmities of the liver also, may be effectually and in a very short time removed, insomuch that the sodden liver of a beast is restored to his former constitution againe, that is, made like unto a raw liver, if it bee boyled againe with this hearbe. But this is to be reckoned among the old wives' fables, and that also which Dioscorides telleth of, touching the gathering of Spleenwort by night, and other most vaine things which are found scattered here and there in old books, from which most of the later writers do not abstaine, who many times fill up their pages with lies and frivolous stories, and by so doing do not a little deceive young students." The Spleenwort of Dioscorides was, however, apparently the Ceterach.

13. Brake (*Ptéris*).

Common Brake (*P. aquilina*).—Fronds three-parted; branches twice pinnate; pinnules linear-lanceolate, the lower ones often pinnatifid or cut. The Brake or Bracken is the most common of all our ferns, and one well known to every one accustomed to the country. Though less elegant and graceful than some of our smaller species, yet it well deserves the epithet of feathery, when it attains a large size, and bows gracefully before the autumnal gale. Like many other ferns, it is not luxuriant on chalky soils, but is abundant on those which are stony or sandy; sometimes half filling the copse by its plentiful growth, often forming picturesque clumps on the heathland, where

"Heath-bell dark and Bracken green"

are among the most frequent plants. On the winter hedge large masses of the dead fronds may often be seen hanging about the boughs, and of one uniform pale brown colour, contrasting with the green leaves of polypody on the trunk of the tree, or with clumps of hart's-tongue, among whose bright green fronds we may see the occasional tint of brown, which tells of the touch of winter. The tall branches of the Brake, too, bordering the park, form an excellent covert for game, and the deer are fond of lying among them:—

"The wild buck bells from ferny brake."

The fronds, though often not more than a foot high, attain great luxuriance in some places, and become taller than any other of our native ferns. They are sometimes ten or twelve feet in height, and their texture is crisp and brittle. In the north of England, and in various parts of Scotland, this fern is used for many domestic and economical purposes. In Scotland, country women may often be seen coming away from the heath laden with its young branches, which serve as food for swine; and the peasant cuts it down in large quantities, and placing it in heaps to dry in the sun, and to be wetted by the rains, uses it when thus prepared for manure on his land; or he cuts up some of the fresh fronds, and mingles them with hay as food for his horses. A writer in the *Magazine of Natural History* says, that in

many of the open mountainous parts of Wales, where it grows abundantly, the Brake is cut down in summer, and, "after being well dried, is burned by the cottagers in large heaps for the sake of the alkali contained in the ashes. When sufficiently burned, enough water is sprinkled on them to make them adhere together; they are then rolled into round balls, about two inches or two inches and a half in diameter. These balls are thoroughly dried, and carried about the neighbourhood for sale in the markets, and they are also frequently kept by shopkeepers to supply their customers." They serve the purpose of economising the use of soap. They are, before being used, thrown into the fire, and when thoroughly heated are placed in water, which thus becomes a strong ley. The ancients are supposed to have used both the fronds and stems of the Brake in diet drinks, and medicines for many disorders have, at various times, been made in our country from this fern. It is very astringent, and has been recommended for dressing and preparing kid and chamois leather; while both in this and other lands the ashes, from the alkali which they contain, were found serviceable in the manufacture of soap and glass, until discoveries in chemistry suggested the use of other materials for the purpose. This very astringency seems to render the Brake unsuitable for the food of man, though some writers think that nutriment would be afforded by its large rhizome. This is often ground to powder, and mixed with the flour used in making the bread eaten in some parts of Normandy; but, perhaps, like the admixture of pine bark with the flour, used in some countries in the north of Europe, it adds rather to the quantity than to the nutritious quality of the bread. The rootstock of this Brake, however, as we are informed by Humboldt, serves the inhabitants of Palma and Gomera, in the Canary Islands, for food. They grind it, he says, to powder, and mix it with a small quantity of barley-meal. This composition is termed *gofio*; and the author adds, that the use of so homely a diet is a proof of the extreme poverty of the people of these islands. This naturalist saw both the Brake and our common northern hard fern growing in the Canaries in great luxuriance, though never attaining either the size or stateliness of the arborescent ferns of Equinoctial America and New Zealand.

Our common Brake is one of the most frequent ferns in many parts of the United States of America. Sir Charles Lyell saw it in abundance on the mountains of New Hampshire, where the maples, with their crimson foliage, and the boughs of the spruce fir, and the rich flowers of the kalmia, waved in their glory above the moist ground, which was covered with the green bracken; and it is in that land, as in ours, used for packing fruit. The author of these pages has often seen this fern employed for making a bright fire on the hearth, and has helped, during childhood, to gather it from the hedges of the cherry orchards of Kent, that the cherry-pickers might bind it over their baskets of fruit, its large fronds keeping the glossy cherries cool and fresh for the London markets. As a packing material for apples it is excellent, for it preserves their freshness better than any other substance, without imparting either the slightest colour or flavour. Both this plant and the male fern have been used in brewing. Professor Burnett observes that from the analysis of the latter, made by Morin, it is probable that they would form one of the best substitutes for hops, as they contain both gallic

1 SEA SPLEENWORT.
Asplenium marinum

2 GREEN S.
A. viride

acid and tannin, which are absent from most of the bitter plants that have been applied to this purpose, and which have failed from being unable to precipitate the glutinous mucilage which renders beer made without hops so liable to turn sour.

This plant was, in all probability, the especial *fearn* of our Saxon ancestors; for although in the sixteenth century several of the commoner ferns were well known and described, yet this is by far the most frequent and most conspicuous plant of the tribe in all parts of this kingdom. To its abundance in several places, doubtless, we owe the old names of various towns and villages, as Fearnham or Farnham, Farnhurst, Farnborough, Farnworth, and Farningham. To this fern, too, probably the old proverbs and poems refer. Several of the latter were collected from the secluded villages of our country by John Ray, but the rustic wisdom which they may be supposed to contain is not always apparent to modern readers. There was a homely proverb once in common use:—

"When the fern is as high as a spoon,
You may sleep an hour at noon;
When the fern is as high as a ladle,
You may sleep as long as you're able;
When the fern begins to look red,
Then milk is good with brown bread."

The name of Brake, as well as the Scottish one of Bracken, is a very old one for this fern. In the old Anglo-Latin dictionary, published by the Camden Society, we find "Brakane or Brakanbuske" described as "ferne or brakans." The Editor, Mr. Albert Way, observes that Ray gives the word "brakes" as generally used in his day; and he adds, that it is generally retained in Norfolk and Suffolk. It is probably pretty general in most counties of the kingdom; it is certainly the common name of the plant in Kent, and the fern is also usually called Brake in North America. Mr. Way observes in a note: "In the Household Book of the Earl of Northumberland, 1511, it appears that water of Braks was stilled yearly for domestic purposes." In other old writers we find it called "forne." Thus, in the "Diary of Henry Machyn, Merchant Taylor of London," written in 1552, we read of a man who was placed in the "pelere" for "selling potts of straberries, the whych the pott was not alff fulle, but fylled with forne."

The portion of the stem of the Brake just below the surface of the earth is often dug up by country children, and cut across, in order that they may see a figure represented by the bundles of tubes and fibres which lie among its cellular mass. Dark brown or black markings may be observed among the whitish substance. In some counties, as in parts of Kent, these marks are fancied to represent the letters JC—a fancy which originated, doubtless, in those superstitious times, when, little as men knew of the open page of Nature, they knew less still of the written page of God's Word, and when they imagined that Nature pointed to truths taught only by revelation. In other places the markings are supposed to show the figure of an oak, and to have first grown there in memory of the tree which gave shelter to King Charles during his flight. An old tradition is yet told that James, the

unfortunate Duke of Monmouth, after the battle of Sedgemoor, concealed himself for some time successfully beneath the Bracken boughs. One day, however, emerging in some degree from his retreat, he sat down, and amused himself by cutting some of the stems of the fern under which he had slept on the past night. Some peasants, who noticed him, were surprised to see a man, clad in homely garb like their own, with delicate white fingers, on one of which glittered the diamond of a ring; and when, soon after, the reward was offered for the apprehension of Monmouth, they recalled the circumstance, and sought for him where he lay concealed beneath the withered heap of fern. No wonder that imagination could readily trace in the heart of the fern some semblance which could identify the plant with the remembrance of the two fugitive princes, the father and son, whose fates were so different. The oak-tree is still believed to be portrayed there; and the author, during childhood, shared in a belief very general in the neighbourhood of her home. In Germany, this figure is commonly called the Prussian Double Eagle; and older, probably, than any other tradition is the received opinion that the marks in the fern stem represent an eagle, and gave to the plant one of its common names, the Eagle Fern. This idea is casually alluded to in one of the colloquies of Erasmus, when one of the speakers observes of the Toadstone, or *Crepaudine:* "Perhaps they imagine the likeness of a toad; as on cutting the root of fern we imagine an eagle."

In the thick shady woods in which our Brake luxuriates, its root-stems creep many feet below the surface of the soil. They are as thick as the finger, and covered with a beautiful soft velvety down. The young fronds, which appear in May, are curled and drooping, of a delicate whitish-green, and very tender, having both that starch-like odour and flavour peculiar to ferns. By September their bright green is touched with golden hue, which finally yields to the brown tint colouring the crisp fronds as they rustle in the winter winds.

The outline of the frond of this fern is somewhat triangular, and it is either twice or thrice pinnate. The greater number of fronds are thrice pinnate, having several pair of pinnæ, with twice pinnate branches. In some cases all the pinnules are entire; in others they are pinnatifid. The stalk is usually rather more than half the length of the frond; it is green, and while young somewhat downy; but as the fern grows older, it becomes very hard and rigid, and has so many angles upon it, that many a wanderer in the woods has suffered from grasping it too hastily. In places where the fronds do not attain any luxuriance, they are more decidedly triangular; they have then the appearance of being three-branched, because the other pairs of pinnæ, so usual on the finer specimens, are not in this case developed.

The fronds of the Brake are almost all fertile; yet, let us gather the plant at what season we may, no fructification is to be seen on its under surface until we search for it; not that the capsules are not abundant, for, during autumn, they cluster in profusion on almost every plant, but they are hidden under the margin. In this plant the margin of the frond forms the indusium. It is thickened into a rim, beneath which lies a row of capsules, which run all round the edge of the fern. If our fathers had known this fern only, we should not have wondered at the idea which some, at least, seem to have

1. COMMON WALL SPLEENWORT.
Asplenium trichomanes.

2. DITTO.
Var incisum.

had, that ferns bore no seed. Pliny says: "Of ferns be two kinds, and they bear neither flower nor seed." The general opinion some centuries later, however, was, that the fern-seed was visible only on St. John's Eve, just at the precise moment at which the Saint was born:—

"But on St. John's mysterious night,
Sacred to many a wizard spell,
The hour when first to human sight
Confest, the mystic fern-seed fell."

The superstitious belief that he who could at that hour get some of the fern-seed became invisible, is frequently alluded to by our old poets. Shakspere makes one of his personages say—

"We have the receipt of fern-seed; we walk invisible."

Fletcher says—

"Had you Gyges' ring,
Or the herb that gives you invisibility?"

And one of Ben Jonson's characters thus refers to it:—

"I had no medicine, Sir, to walk invisible;
No fern-seed in my pocket."

Yet the seeds (spores) of ferns are very numerous, and myriads are borne on the slightest summer breeze, like a thin vapour, and sent forth to fertilize our beautiful earth. Professor Lindley observes of the hart's-tongue, which is but a small fern, that a little computation will show its means of dissemination to be prodigious. Each of its clusters, he tells us, consists of 3,000 to 6,000 capsules. Taking 4,500 as the average number, then each frond has about 80 clusters, which makes 360,000 capsules per leaf; the capsules themselves contain about 50 spores or seeds, so that a single leaf of Hart's-tongue may give birth to no fewer than 18,000,000 of young plants.

Thus numerous and beautiful, too, in themselves, are the spores of ferns, enclosed within the elastic rings of their tiny cases, which are seen by the aid of a microscope to be covered over with markings so varied and so delicate, that the line of the finest pencil can scarcely represent them. The finger of God has traced them there, and left them to speak to us of His power and skill.

Each pinnule of the Brake has a mid-vein, whence issue side veins, which are either opposite or alternate. These are twice forked before reaching the margin, where they unite with a vein which runs round the edge, and forms the receptacle for the clusters of capsules. The indusium consists of a white membranous fringed expansion of the thin skin of the upper surface, which rolls under so as to cover the fructification seated on the marginal vein. Beneath this line of capsules is another bleached and fringed membrane, very similar to the first, which is also apparently an expansion of the skin of the under surface.

If the rhizome of the Brake be dug up undeveloped fronds of various ages will be found, as well as the decaying bases of fronds that have fallen; it is found that the smallest of these immature fronds take two years to arrive at the glory of full expansion. The male fern and some others take as long.

The following lines were written for this volume by Mary Isabella Tomkins:—

THE BRACKEN.

As a coming screen grows the Bracken green,
Up springeth it fair and free,
Where in many a fold, grotesque and old,
Twineth the hawthorn tree;
A covert meet from the noontide heat,
For should you steal anear
You may chance discern, 'neath the spreading fer
The antlers of the deer.

It boasteth a name of mystic fame,
For who findeth its magic seed
A witching and weirdly gift may claim
To help him at his need:
Unseen, unknown, he may pass alone
Who owneth the fern-seed spell;
Like the viewless blast, he sweepeth past,
And walks invisible!

Have ye to learn, how the Eagle fern
Doth in its heart enshrine
An oak-tree like that which the hunter Hearne
Haunted in days "lang syne"?
An oak-tree small is repeated all
Complete in branch and root,
Like the tree whereunto King Charles did flee,
When press'd by hot pursuit.

To his son its shade gave but traitor aid
When, striving to lie conceal'd,
On foot he fled, in fear and dread,
From Sedgemoor's fatal field:
In doublet mean was a peasant seen,
Wearing a priceless ring—
He whom the voice of the people's choice
So late had hail'd their king.

Oh, Eagle fern! when I thee discern,
When thy wither'd leaf I meet,
In places the careless foot might spurn,
The crowded mart or street,
Thou takest me back to thy birthplace fair,
Where thou wavest in thy pride,
And the form of the hare and the deer's close lair
Do 'mid thy stems abide.

14. MAIDEN-HAIR (*Adiántum*).

True Maiden-hair (*A. capillus-véneris*).—Fronds bipinnate; pinnules stalked, lobed, roundish, wedge-shaped, alternate; barren lobes serrated; fertile lobes terminated by a linear-oblong cluster of fructification. Our only British species of this genus is easily known from all other native ferns by its fan-shaped leaflets, but the characteristics of the genus are to be found in the veining and the marginal fructification. The plant is called True Maiden-hair, to distinguish it from some other ferns which share with it its familiar name. It is one of the loveliest of our native plants, and in its wild state is among the most rare; but it is familiarly known to fern-lovers, because it is one of the most frequent ferns grown indoors. The main stalk of our Maiden-hair is seldom thicker than a packthread, and the little stalks which support the thin fan-shaped pinnules are so slight and elastic, so black

LADY FERN.
Athyrium filix-fœmina.

and hair-like, as to have gained for the fern its specific name. Its slender creeping rhizome is shaggy, with black hair-like scales, and the base of the stipes is of a rich red-brown colour. The fronds, which grow in lax tufts, make their appearance about May, and are matured by June: they are usually about six or seven, but sometimes twelve inches in height. They are either twice or thrice pinnate. The pinnæ, or branches, diverge alternately from the stalks; the little leaf-like pinnules are also alternate, and each is placed on a separate stalk. The form of the leaflets, though varying much in different situations, is yet more or less fan-shaped, the terminal one being often wedge-shaped. The margin is lobed, the barren lobes are serrated, but the edges of the fertile lobes are turned under, and thus form a membrane-like indusium to the clusters of fructification. The stalk is usually about half the length of the frond, and is glossy black, or deep purple. The veins in all the pinnules are two-branched or forked from the base, the branches extending in straight lines to the margins, where in the barren fronds they end in the marginal notches. In the fertile fronds, however, they extend into the indusium, and become the receptacle for the clusters.

The bright cheerful evergreen tint, the elegant form and lightly waving attitudes of this fern, render it very attractive; and when growing against the sides of the sea-rock or any moist place in any abundance, no fern exceeds it in beauty. Sir William Hooker remarks that this most delicate plant is very abundant in the south of Europe, where he has seen it lining the inside of wells, as it does the basin of the fountain at Vaucluse, with a tapestry of the tenderest green. It grows, sometimes, even on rocks washed occasionally by the spray. It is not a Scottish fern, but occurs on the south and west coasts of Ireland in great luxuriance; in the Burren, Co. Clare, it attains a length of two feet. It is also plentiful in some spots in Wales, the Isle of Man, and the Channel Islands, but the only English localities for it are Cornwall, Devon, Somerset, Dorset, and Shropshire. Mr. N. B. Ward sent specimens of the Maiden-hair to Mr. Newman from the neighbourhood of Ilfracombe, where he found it growing in great beauty on the face of the crevices of a rock in White Pebble Bay, in a dense mass, which commenced at the height of about twenty-five feet, and descended to within about five feet of the level of the sea. It prefers a perpendicular surface. It is a native of almost all tropical lands. Few ferns would be more graceful adornments to the sides of streams and pools, were it not so easily injured by the frost in exposed situations; though in the Wardian case its greenness is to be seen as well in the depth of winter as in the summer. The surface of the frond is always so smooth that water runs from it. Pliny had observed this, for he says, "In vain you plunge the Adiantum in water; it always remains dry."

The fronds of this fern have, from earliest times, been used in this country as a remedy in pulmonary complaints. They yield, when boiling water is poured on them, some degree of mucilage, and emit at the same time a slight odour. That ancient writing known as the Arundel MS. says of this plant: "It mundifyeth the lunges, and the breste, and caccheth out wykede materes in hem;" while from the same authority we learn that "Margery perles wastyn and fordon and cacchen out of the body wykede humours."

The Maiden-hair seems to have been universally regarded as a cure for cough and difficulty of breathing; and Kalm relates that the American Indians have used it from time immemorial for this purpose. John Ray cites it as a cure for innumerable maladies; and later herbalists praised the decoction of the Maiden-hair, not as a remedy only for cough and other pectoral complaints, but as also a cure for jaundice, swollen joints, and many other diseases; and affirmed that it "stayeth the falling or shedding of the hair, and causeth it to grow thick, fair, and well-coloured;" though, in the preparation of the plant for this purpose, the herb termed smallage, which is our wild celery, was added, and both were boiled in oil and wine.

The Canadian species of Maiden-hair (*Adiántum pedátum*) was introduced into this kingdom by John Tradescant. It grows in Canada in such profusion, that when the French were in possession of that country they were accustomed to send over large quantities of the plant to France, merely as a package for goods, and hence the druggists of Paris used this fern extensively instead of the True Maiden-hair. Both plants possess some astringency, and in France are still taken for coughs; but the chief use of Maiden-hair in our times is in the preparation of Capillaire, which is made by boiling the fern into a syrup with sugar, and flavouring it with orange-flowers. The French term our native species *Capillaire de Montpellier*, but they also call it *Adianthe;* while the Dutch and Germans term it *Venus-haar*, and the Spaniards and Italians *Adianto*. It is a safer plant to use in decoction than the Canadian species, as that has some emetic properties, if taken in any quantity. Our beautiful plant grows in great abundance in the South Isles of Arran, off the coast of Galway, covering the rocks with its light-green fronds; and the people of these isles use it as a substitute for tea.

Sub-Order II. HYMENOPHYLLACEÆ.

15. BRISTLE FERN (*Trichómanes*).

Rooting Bristle Fern (*T. radícans*).—Fronds three or four times pinnatifid, segments alternate, linear, entire, or two-cleft, obtuse; involucres solitary in the axils of the upper segments. This is an exceedingly beautiful fern, both in its form and in the delicate transparency of its texture. Humboldt remarks that every traveller mentions the elegant Trichomanes which covers the walls and roofs of the antique houses and chapels at Teneriffe, which, he says, in their deserted condition offer great treasures to the botanist. He adds that the ferns are nourished by the fogs which abound in the neighbourhood. Specimens from Madeira are to be found in the herbaria of most persons who have visited that island, more luxuriant, perhaps, but not more beautiful, than those found at Killarney. Our Bristle Fern delights in shade and moisture. It is found in several stations in Ireland—the Turk Waterfall, near Killarney, being one often visited by botanists, who have recorded the enthusiastic delight with which they have looked on the hundreds of delicate fronds which form green masses there. It was formerly seen by Mr. Newman very near the waterfall, but the guide of the place has sold so many pieces of this rare treasure to visitors that the plant is almost exterminated at that spot. It occurs, however, in several other localities,

SCALY SPLEENWORT
Ceterach officinarum.

forming by its masses a rich verdant drapery to the wet rock, for it is only in places constantly moist that it can be found, the slightest exposure to drought withering its frail frond. Formerly it grew at Bingley, Yorks, and in recent years it has been found in Wales and the Isle of Arran, Scotland.

It was in a mossy nook near Killarney, made greener by trickling waters, that a friend, who termed the nook the "Birthplace of the Ferns," and saw its matted fronds drooping among rocks, wrote for our volume the following lines:

Beside a waterfall, where silvery mist,
Even in summer, makes the noontide dim,
Where clear brown shallow waters curl and twist
Round moss-grown rocks tree-clasped by rootlets slim,
Seated on stones that cumber sore the stream,
Listening the tiny torrent's whirl and dash,
I love to dream a wildering noontide dream,
Bright, swift, and changeful as the waters' flash.

Mark ye the ferns that clothe these dripping rocks;
The crosier-headed ferns, most fresh and rare;
Their hair-like stalks, though trembling 'neath the shocks
Of falling spray-drops, rooted firmly there.
What quaint varieties! The leaflets glow
With a metallic lustre all their own,
And velvet mosses, fostered by the flow,
Gain a luxuriance elsewhere all unknown.

It was owing to the occasional dryness of the atmosphere that, until the introduction of Mr. Ward's closed cases, this fern withstood all attempts of the cultivator to rear it. If we take up any work on ferns written a few years prior to that invention, we find the author commenting on the absolute impossibility of domesticating the Bristle Fern as an ornamental plant, though in the glass cases it is now often to be seen, producing larger fronds than in its native locality, and by its green beauty delighting the eye of the dweller in the smoky town, or cheering the heart saddened by long sickness and absence from the scenes of Nature. In Mr. Ward's interesting work on the growth of plants in closed cases—a little book honourable alike to the thoughtful intellect and kind heart of its writer—this gentleman says, that when making the experiments which led to his plan of glass cases, he was induced to commence with this, the most lovely of our flowerless plants, in consequence of its being the most intractable under ordinary culture; of its being, in fact, as he says, the "*opprobrium hortulanorum.*" "Loddiges," says Mr. Ward, "who had it repeatedly, never could keep it alive; and Baron Fischer, the superintendent of the botanic establishment of the Emperor of Russia, when he saw the plant growing in one of my cases, took off his hat, made a low bow to it, and said: 'You have been my master all the days of my life!'" On some rock-work in Mr. Ward's fern-house this plant produced fronds fifteen inches in height by seven or eight in breadth—one-fourth larger than uncultivated specimens, either from Killarney or elsewhere.

The small portion of Trichomanes represented in the plate is part of a very interesting specimen given to Mr. Dickes by Mr. N. B. Ward. The latter gentleman, in a letter to the author, says of it: "Some years since, when I had the pleasure of visiting Killarney with Dr. Harvey, we determined to find out, if possible, another locality for *Trichómanes radícans;* and to this end directed the driver to convey us to some portion of the shores of

the lake into which one of the mountain streamlets was continually discharging, well knowing that, in the course of such a rill from the mountain-top, there would occur many places suited to the growth of this moisture-loving plant. We were landed accordingly on the south side of the lake, amid a mass of osmunda, and after making our way up the stream a few hundred yards, surrounded by masses of rocks confusedly hurled, and coated with fine hymenophyllum, and various mosses and liverwort, Dr. Harvey, who was in advance, called out, 'Eureka—Eureka!' I hastened onwards, and saw a sight which might have repaid a much more lengthened and laborious search. In the inside of a natural cave, about five feet square, formed by four large masses of limestone, the Trichomanes was growing in its native beauty. One specimen, with a creeping rhizome three or four feet in length, and containing forty-eight perfect fronds, we divided, and my portion is now in the hands of your artist. The mouth of the cave faced the north, so that not a ray of solar light ever reached the plant within; and to this cause I attribute the total absence of fructification on any one of the specimens."

The Bristle Fern has a slender creeping horizontal stem, which winds and branches so as to form a network over the rock, and is covered with black down. This woolly substance has been found by Mr. Andrews, when viewed under a lens of high power, to consist of articulated bristles, analogous to the scales on the stems of other ferns. The whole frond is so pellucid, the veins so prominent, and the green part so like a membranous wing around the veins, that it has more the appearance of a sea-weed than a fern. The frond is between lanceolate and triangular in form, the divisions being so much waved as to give it a crisped appearance. It is three or four times pinnatifid, and the slender segments of which it is composed are either entire or two-cleft at the apex, and a strongly-marked and stout vein runs up the centre. Indeed, the veins are so prominent and rigid, that they seem the most conspicuous part of the fern, and the frond might very well be said to consist of a number of firm veins, three or four times branched, and edged by a thin green membrane-like wing. Some of the terminations of the veins are surrounded by the green part, which forms a little cup in which lie the capsules of fructification. The involucre, as this is usually called, most commonly projects beyond the margin of the frond, but it sometimes lies within it, and the bristle is often four or five times the length of the cup, though in many cases scarcely exceeding it in length. The fronds are from three inches to a foot long, and mostly droop over the sides of the rocks. Though appearing in May, they are not matured till about November, nor do they attain their whole size or bear their fructification until the third year of their growth. Now that it is discovered to thrive so well in the closed cases, this plant is a favourite subject of the cultivator's care. It requires a pure and constantly humid atmosphere, shade and warmth, and these conditions can all be given by the glass case. It may be grown also in an earthen pot standing in water, and covered with a bell-glass. A variety of this fern, of broader lanceolate, somewhat egg-shaped form, has been termed *andrewsii*, after its discoverer; it is found at Kerry. The Bristle Fern is by various writers called *Trichómanes brevisétum*, *speciósum*, and *Hymenophýllum alátum*.

1 HARTS TONGUE SPLEENWORT 1/6th Nat size
Scolopendrium vulgare

16. FILMY FERN (*Hymenophýllum*).

1. **Tunbridge Filmy Fern** (*H. tunbridgénse*). — Fronds pinnate; pinnæ pinnatifid, forming a wing on each side of the rachis; the segments serrated and spinous. This delicate, flaccid, membrane-like fern grows in matted tufts, looking rather like a withered than a living plant, on account of its olive-brown tint, though when really dried in the herbarium it retains much elasticity. The slender, delicate Filmy Ferns are the smallest of our native species, and are somewhat like delicate mosses. The veins are so strongly marked, that, as in Trichomanes, they seem to form the fronds, the filmy cellular portion surrounding them like a wing. Their length is from one to three inches, they grow almost erect, and their outline is lanceolate, or somewhat egg-shaped. They are flat, and their pinnæ once or twice pinnatifid, their branches mostly on the upper side, though sometimes alternately on each side of the pinna. The clusters of capsules are formed round the axis of a vein, which runs beyond the margin of the frond—this vein, or receptacle, being enclosed in a kind of cup forming the involucre. This consists of two compressed valves, which are nearly round, and are swollen slightly at the base, and have a notched and spinous upper margin; and it is by this two-valved involucre that the genus is distinguished from the nearly allied Bristle Ferns. The rhizomes are creeping and very slender.

This fern is not peculiar to Tunbridge Wells, though found on several moist rocks in that neighbourhood; and having been first discovered there, the plant is known by the trivial name *tunbridgénse*. It is not a rare fern, as it grows amongst moss in damp and shady places, especially in mountainous or rocky districts in several parts of this country—as in Tilgate Forest, Sussex; on Dartmoor, in Devonshire; in many parts of Cornwall; in several localities of Cumberland, Westmoreland, Kent, Cheshire, Yorkshire, and Lancashire. It is also of frequent occurrence in Wales and Ireland, and in the latter country is sometimes very luxuriant. In Scotland it occurs as far north as Argyll, Stirling and Mull.

2. **Wilson's Filmy Fern or Scottish Filmy Fern** (*H. unilátérale*). —Fronds pinnate; pinnæ curving backwards; segments linear, entire, or two-cleft. This is a small film-like fern, growing on wet rocks in various parts of England and Wales, and very abundant in the Highlands of Scotland, as well as in many parts of Ireland, in similar situations and localities as those given for *H. tunbridgense*. Though it grows, like the Tunbridge Fern, in matted tufts, and the two plants are often found on the same rock, yet it is a very distinct species. The fronds are much more rigid, of a darker brownish-green tint, somewhat drooping in attitude, and the pinnæ turning back in a direction contrary to that of the fructification. They are about two or three inches long; their outline is linear-lanceolate and pinnate. They last for several years, and continue their growth even after the first season. The rachis is somewhat arched, and the pinnæ are convex above, all turning one way, so that the fronds are more or less one-sided. The wedge-shaped pinnæ are cut into slender, blunt, pinnatifid segments, having a serrated and slightly spinous edge. The rigid veins are twice branched, and have a narrow leafy wing; but the main stalk of the fern is not winged,

or scarcely so. The free ends of the veins are surrounded by the clusters of capsules, which are placed within a cup-shaped, brown, rigid involucre, the valves of which are convex throughout, touching only by their edges, which are quite entire. Some authors regard it as a variety, or at most sub-species, of *H. tunbridgense*.

Sub-order III. OSMUNDACEÆ.

17. ROYAL FERN (*Osmúnda*).

Osmund Royal or Flowering Fern (*O. regális*). — Fronds twice pinnate; pinnules oblong, nearly entire, the lower base somewhat ear-shaped; clusters in terminal panicles. This stately fern, which is also sometimes called King Fern and Regal Fern, is so different in its appearance from our other British species, that the botanist only would know it to be a fern, unless the veining of its leafy frond were examined. It is the most conspicuous of all our native species, and well deserves its regal name, which, however, it appears to have owed to other circumstances than its stately form. Its name, *Osmúnda*, is of Saxon origin, and, perhaps, was given in honour of some one who in old times bore the name of Osmund. Osmunder was one of the titles of Thor, the Celtic Thunderer. Some believe the word itself to have signified domestic peace, from *os*, house, and *mund*, peace; however, the word *mund* was evidently sometimes an adjunct signifying strength and power, and formed part of many a name in the olden time, as in Sigismund and Edmund. It is in all probability the origin of the old word used by the herbalists, who relate of several plants that they "mundyfye" the system, apparently meaning that they give strength. Gerarde, when describing the stem of this fern, which on being cut through shows a whitish centre, calls this portion of the plant the "Heart of Osmund the Waterman"; a waterman of this name having, according to tradition, dwelt at Loch Tyne, and on one occasion, when bravely defending some of his family from the cruel Danes, sheltered them among the tall branches of this magnificent plant, which is more like a shrubby or tree fern than any other of our native species.

The Flowering Fern is distributed more or less throughout the kingdom, occurring on bog lands, on the wet margins of woods, or on the hedge-bank watered by a stream, where its rootlets can have access to the water. It is rarely to be found in the eastern part of England and Scotland, though occasionally gratifying the lover of ferns by its unexpected appearance there. So abundant, however, is it, and so luxuriant in its growth, in many places in Devonshire and Cornwall, as well as about Connaught, in Ireland, that its masses form a marked feature of the scenery. It grows well, too, on the bogs of Lancashire; and sometimes its towering fronds enliven even the dreary sea-coast, where they thrive well on spots only just beyond the reach of the wave at high tide. It generally rises to the height of four or five feet, but tufts of its fronds, growing on the bank of the Clyde, have been measured by botanists, and were found to be eleven feet high. Generally its tall stalk rises erect, and its fruit-panicles overtop the plants which grow beside them; but sometimes this handsome plant acquires a drooping habit.

HARD FERN.
Blechnum boreale.

Mr. Newman, referring to it, says: "I noticed a beautiful instance at Killarney, where it completely fringes the river between the lakes, and certainly forms a most prominent feature in that lovely but neglected portion of that far-famed scenery. So altered is the usual character of this fern, that its long fronds arch gracefully over, and dip their masses of seed in the crystal water; while the saucy coots, from beneath the canopy it affords them, gaze fearlessly on the visitors who are continually passing by." In the north of England it is found at an elevation of 1,000 feet.

This fern is not difficult of culture, and growing in a large pot of earth kept in water, and placed in the shade, it makes a lovely ornament among the myrtles, and hydrangeas, and rhododendrons which so often grace the hall of a house. It also thrives well on the margin of pieces of water, or on rock-work near them. It is common to most European countries. The Germans call it *Traubenfarrn;* the Dutch, *Trosvaren;* the Italians and Spaniards, *Osmunda;* and the French, *Osmonde.*

The young fronds of the Osmunda are usually about ten or twelve in number, but they are sometimes fewer. Their large leaf-sprays are thin and crisp, and of a bright sea-green colour, usually assuming a deeper green as the plant grows older. The stalk, which is at first reddish-brown, afterwards becomes green, and contrasts well with the rich rust-brown spikes of fructification, which formerly misled people into the belief that this fern, at least, produced flowers. These shrub-like fronds are, however, annual, and some of them are barren. They are lanceolate and twice pinnate, the pinnæ being either lanceolate, or lanceolate and egg-shaped, and the pinnules are oblong and nearly egg-shaped. They are also somewhat ear-shaped at the base, rounded at the upper part, and the margins are serrated. The pinnæ at the upper portion of the fertile frond are so densely covered with the brown clusters of capsules, as to look something like spikes of flowers; and they so contract the green leafy portion, that they leave only a green edge, and the mid-vein clear. Lower down on the frond we often see a pinnule or two thus contracted, and partly or wholly covered with the fructification; and we may, during the earlier growth of the plant, trace the gradual contraction of the leafy part of the frond through all the stages, till it is converted into this panicle. This is often, when matured, two or three feet in length, and branched so as to be a yard wide.

The barren fronds are leafy throughout, but differ in no other respects from the fertile ones. In their most luxuriant state, the fronds of this handsome plant are sometimes nearly two yards across.

In the barren fronds we may easily perceive the mid-vein of each pinnule, with twice or thrice forked veins issuing from it to the margin. In the fertile fronds the clusters of capsules are seated on these veins, which are just sufficiently developed to form a receptacle. The capsules are nearly globular, stalked, and two-valved.

This plant, which appears in May, is matured by August, but is destroyed by the early winter frosts. It was formerly in much repute for its medicinal properties, but it is now little used, though its stem is astringent and somewhat tonic. An old writer, who calls it also the Water Fern, says: "This hath all the virtues mentioned in other ferns, and is much more effectual

than they, both for inward and outward griefs, and is accounted good in wounds, bruises, or the like. The decoction to be drunk, or boiled into an ointment of oil as a balsam or balm, and so it is singular good against bruises, and bones broken or out of joint." The root, when boiled, is very slimy, and is used in the north of Europe for stiffening linen.

Sub-order IV. OPHIOGLOSSACEÆ.

18. MOONWORT (*Botrýchium*).

1. Common Moonwort (*B. lunária*).—Frond pinnate; pinnæ crescent-shaped or fan-shaped. It is on the dry open moor, amongst heather and heath-bells, that we must look for the Moonwort, which, though not a common plant, is more or less distributed throughout the United Kingdom. In England it seems to occur most frequently in the counties of Staffordshire, Surrey, and Yorkshire; generally on old pasture-lands or heathy places: but it has occasionally been gathered in a wood. Like the royal fern, its habit differs much from that of ferns in general, and it is well named Moonwort, from the usually crescent-shaped leafy pinnæ. Doubtless this form induced the old alchemists and professors of magic to value it so highly, for moon-shaped plants, or parts of plants, were readily believed to indicate some wondrous potency. And several old poets refer to it:—

> "And I ha' been plucking plants among
> Hemlock, henbane, adder's tongue;
> Nightshade, Moonwort, Ibbard's-bane,
> And twice by the dogs was like to be ta'en."

Many of our oldest writers on plants had most firm assurance of strange powers possessed by this fern: thus Cole remarks—"It is said, yea, and believed, by many, that Moonwort will open the locks wherewith dwelling-houses are made fast, if it be put into the keyhole; as, also, that it will loosen the locks, fetters, and shoes from those horses' feet that goe on the places where it groweth; and of this opinion was Master Culpeper, who, though he railed against superstition in others, yet had enough of it himself, as may appear by his story of the Earl of Essex his horses, which being drawne up in a body, many of them lost their shoes upon White Down in Devonshire, neer Tiverton, because Moonwort grows upon the heaths." George Wither, writing 1622, says—

> "There is an herb, some say, whose vertue's such
> It in the pasture, only with a touch,
> Unshoes the new-shod steed."

There were herbalists, however, even in those credulous times, who denounced this belief; as did Turner, who published his "British Physician" in 1687, and who says, that the plant is neither smith, farrier, nor picklock; yet even he prizes the fern for its medicinal virtues, and declares himself confident that it is the moon's herb. Gerarde mentions the use of this fern by the alchemists, who, he says, called it Martagon. It appears to have entered into some of those compositions over which so many men spent their nights and days in fruitless labour and frequent disappointment. It may be, however, that now and then some unexpected good resulted from

COMMON BRAKE.
Pteris aquilina.

Pl. 809.

their labours, just as the German chemist Glauber, in his ardent pursuit of alchemy, discovered the sulphate of soda, since called Glauber's Salts. Gerarde, who calls the notions prevalent in his time of the magical powers of the Moonwort "drowsy dreams and illusions," yet held the general opinion of its medical efficacy, and its use as an application to wounds.

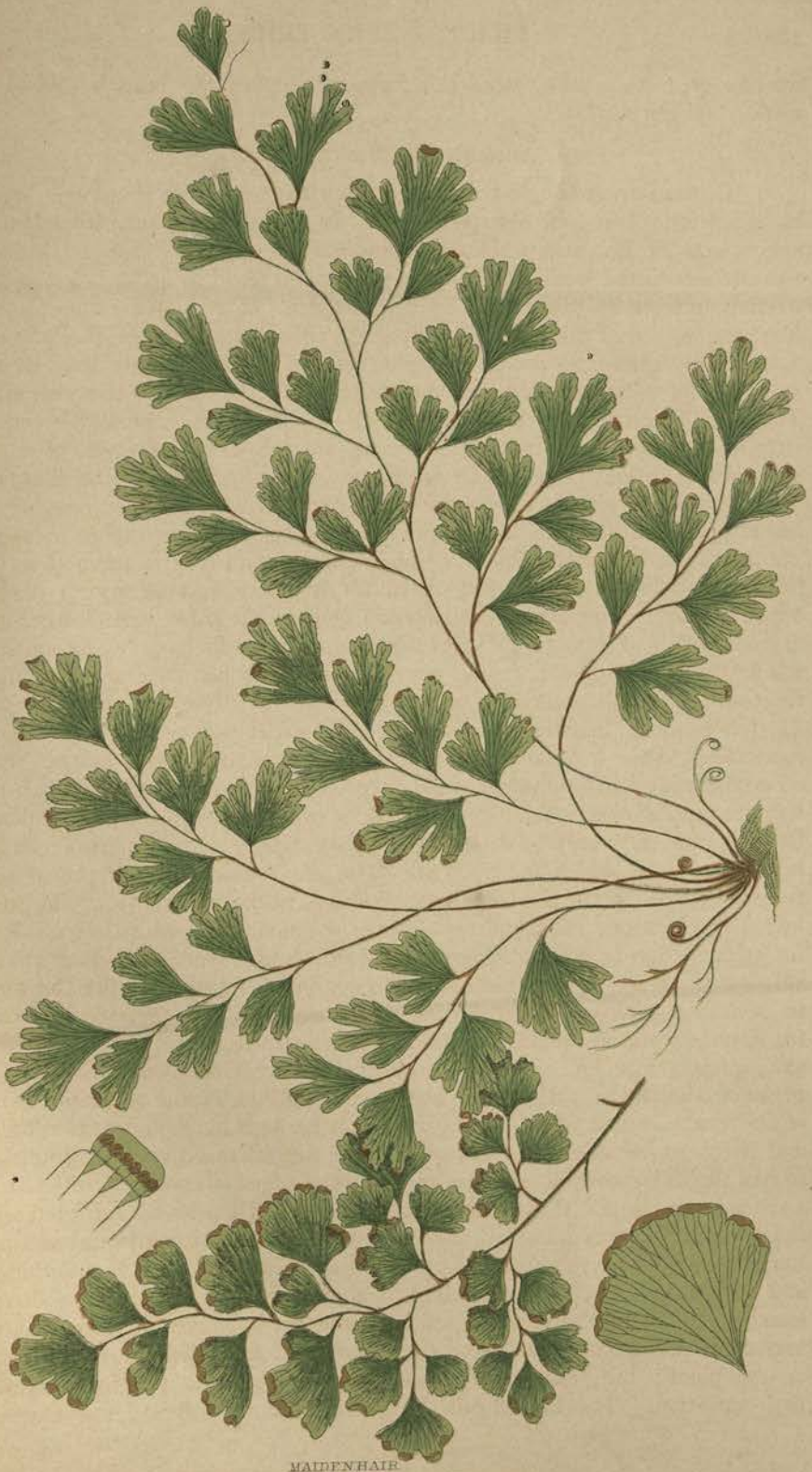
The frond of our common Moonwort rises very early in spring, and would not, in its young condition, suggest the idea that it was a fern. It seems at first but an upright simple stem, about an inch high, but this is in fact a bud, enclosing the frond within it; the lower part or rachis of the frond, thus covered up, is thicker than the upper part, and the two branches of the young frond face each other, the fertile being clasped by the barren one, while the whole is closely wrapped in scale-like sheaths. The plant, when in June it has become fully developed, is from three to eight, or more rarely ten, inches in height, of a dull yellowish-green colour, the lower part or stipes being succulent and hollow, and having at its base the remains of the scale-like sheath which once invested it. About halfway up it divides into two branches. The leafy branch is pinnate, and from three to eight pairs of crescent or fan-shaped leaflets are closely crowded upon it, their outer margin indented with slightly-rounded notches. The veins radiate towards the margin, one vein extending into each notch. The fertile branch of the fern is erect and branched, the branches being generally about the same in number as the pinnules on the leafy branch; these side pinnæ are again divided into lesser branches, on which the fructification grows. This forms a spike distinct from the leafy expansion, and is not, as in *Osmúnda*, a contraction of the green part, nor are the clusters or capsules crowded, like those of that fern, into a mass; but though nearly touching each other, they are separate, and arranged in single rows along the branches of the spike. The capsules are globular in form, without stalks, smooth, composed of two concave valves, and are at first yellow and afterwards brown. The fern varies in different situations, and in one form the pinnæ are pinnatifid; but it is at all times so distinct from any other British fern that it is never difficult of recognition. It is known throughout Europe and Northern Asia. It is sometimes called *Osmúnda lunária*.

2. **Chamomile-leaved Moonwort** (*B. matricariæfolium*).—A form known to the botanists two centuries ago as occurring in this country, and distinguished by Ray as *Lunaria minor foliis dissectis*, is mentioned in some modern works as *B. rutaceum*, and specimens collected on the Sands of Barry by Mr. Cruickshanks, in 1839, have been by some referred to under this name, whilst others consider them more correctly named *B. matricariæfolium*. Unfortunately, only a drawing (reproduced in Newman's "British Ferns") exists of the Barry examples. In 1887, Dr. St. Brody found on the seashore at Stevenston, Ayrshire, a Moonwort which appears to agree with the Continental *B. matricariæfolium*. A figure and description of it were given by Mr. W. Whitwell, F.L.S., in the *Journal of Botany*, 1898, and the publicity thus ensured will probably set botanists searching for it, and perhaps result in its addition to the lists of undoubted British ferns. It differs from *B. lunaria* in having a longer stipes and more stunted leafy portions, the pinnæ lance-shaped and pinnatifid, the lobes somewhat wedge-shaped. The

fructification, too, takes more the form of a cyme, the branches being of more equal length.

19. Adder's-tongue (*Ophioglóssum*).

1. **Common Adder's-tongue** (*O. vulgátum*).—Barren frond egg-shaped, blunt; fertile frond club-shaped. This is a common plant, abundant in many parts of England, and easily known from any other fern. One who was not a botanist would describe its full-grown frond as being a green leaf, sending up from its base a stalk bearing a spike. If we look for this plant in May, we may find the bud underground: this was formed in the previous autumn, and on being opened, it may be seen to enclose not only the leaf and spike for the next year, but also the rudiment of the leaf for the year after. The plant, when seen in the middle of the month of June, at which time it is fully developed, is erect, with a long smooth succulent stem, of a pale green colour, a leaf of a deeper green tint, not with forked veins like most ferns, but with veins forming a net-work; while from the inner part of the leaf rises the stalk, which varies from about an inch to three inches in length. The spike on this stalk tapers towards the summit, and is formed of two lines of crowded capsules imbedded in its substance, and occupying its two opposite sides. The capsules, which are globose, are filled with a fine dust, like the pollen of flowers. When fully ripened they discharge their contents, which are spores, and if the soil is moist, the plant becomes so plentiful in the pastures in the course of a few summers as to injure them greatly. Though local in distribution, yet in parks and clayey pastures we might sometimes gather a basketful of plants in the course of a few hours. It is no marvel that our forefathers called it Adder's-tongue, or Adder's-spear, for, like the reptile after which it was named, it was believed to have great power for evil, and not only to destroy the grass among which it grew, but to injure the cattle which fed upon it. The plant was, however, prized as a remedial agent by the old herbalists. Gerarde said of it, that it would, when boiled in olive oil, afford "a most excellent greene oyle, or rather a balsam for greene wounds, comparable to oyle of St. John's Wort, if it doth not far surpasse it; whose beauty is such that very many artists thought the same to be mixed with verdigrease." No doubt many of the vegetable remedies for wounds were rendered serviceable by the oil with which the juices were so frequently mingled. A preparation, called the "Green Oil of Charity," is in some counties still deemed a panacea; and Adder's-spear ointment, made of our fern, mingled with plantain and other herbs, is in much use in villages, and its green leaves are yet laid on wounds to heal them, serving doubtless to cool the inflammation, and also to unite the edges of a wound inflicted by a sharp instrument. Culpepper praises the juice of the leaves mingled with the distilled water of horse-tail, as a "singular remedy" for internal wounds. Large quantities of the plant are gathered in some villages of Kent, Sussex, and Surrey, and prepared according to the old prescriptions. The barren frond of the Adder's-tongue is often forked, or even deeply lobed at the extremity, and sometimes two or three spikes of fructification may be seen on one plant; but, excepting in luxuriance of growth, the fern exhibits little variation. The French call the plant *Langue de serpent;* the Germans



MAIDENHAIR
Adiantum capillus-veneris

term it *Natterzünglein;* and it is also the *Adderstong* of the Dutch; the *Lingua serpentina* of the Italians; and the *Läketunga* of the Swedes.

2. **Lesser Adder's-tongue** (*O. lusitánicum*).—Barren frond linear, or linear-lanceolate; fertile frond club-shaped. This is a little plant, very much resembling the Common Adder's-tongue in miniature, having the spike produced from among its bright-green tiny leaves in the same manner, but not exceeding altogether two or three inches in height. It had long been known to botanists as a native of Southern Europe, but it was discovered in the year 1854 to be wild in Guernsey. Mr. George Wolsey then found it among the short herbage of some rocks not far from Petit Bot Bay, on the south coast of the island. It has since been found in Guernsey growing wild in meadows, its fronds being in perfection in the latter part of January. Hooker regards it as a sub-species of *O. vulgatum*, but its several divergences from that form induce others to regard it as specifically distinct. The root-stock is more tuberous, the blade of the frond more lance-shaped and much narrower, and the spores are smooth, whilst those of *O. vulgatum* are rough with tubercles. It cannot be regarded as a local form, for it is found in twenty other countries.

Order CIII. LYCOPODIACEÆ—CLUB-MOSSES.

This order consists of flowerless evergreen plants, with simple, veinless, usually taper-pointed leaves, with their capsules seated in the angle formed by the leaf and the stem, or raised in spikes at the top of the stem. The capsules are destitute of a ring, and are 2 or 3-valved.

CLUB-MOSS (*Lycopódium*).—Capsules 1-celled, 2-valved, containing minute spores (*microspores*); or 3-valved, enclosing a few large spores (*macrospores*); stems rigid, clothed with short leaves. *L. selaginoides* is by some authors placed in the genus *Selaginella*, which with *Isoetes* constitutes the order *Selaginellaceæ*. Name from *lycos*, a wolf, and *pous*, a foot, from a fancied resemblance of the branches to the paw of a beast.

1. CLUB-MOSS (*Lycopódium*).

1. **Common Club-moss, Stag's-horn-moss, Fox-tail, Wolf's-claw** (*L. clavátum*).—Leaves scattered, linear, curved inwards, hair pointed; spikes stalked, two or three together; scales egg-shaped, somewhat triangular, serrated. This Club-moss is the commonest of all the species. It occurs in abundance on moors and bogs, and on most of the mountains in the north of England, Wales, and Scotland. It is found in similar places in many of the northern parts of Europe and Asia, and from Canada to Pennsylvania, in America. It is a fine-looking plant, having creeping stems some feet in length, and bearing many branches, which are at first a little raised from the ground, but which soon become prostrate. It is sometimes very luxuriant, and Mr. Newman mentions having frequently found plants on a hill near Farnham, in Surrey, measuring ten or twelve yards in circumference. Its stems are attached to the soil, at every part where they touch it, by scattered yellowish roots, and its branches cross each other, so as to form a large green network over the soil; hence the Swedes call the plant *Matte-grass*.

The stiff wiry branches and stems of the Stag's-horn are thickly surrounded with small narrow leaves of a lanceolate form, flat and smooth, but with slightly-toothed edges. The thread-like point, which terminates each little leaf, gives a greyish tint to the otherwise bright-green hue of the plant. The upright stalks, on which the spikes are placed, are destitute of leaves, but have some small leaf-like scales irregularly disposed in whorls around them, and pressed close to their surface; they are pointed, but have not the hair-like points of the leaves. The spikes of fructification, which are usually more than an inch long, are placed each on a partial stalk about twice its length—one or two, or sometimes three, of these terminating the main stalk. They are formed of a number of triangular, egg-shaped, leaf-like bracts, or involucres. The capsules are placed in the angle formed by the bract and the stem. Each is two-valved, kidney-shaped, of a pale yellow colour, and filled with sulphur-coloured powder, single particles of which are too small to be seen by the naked eye. After these dust-like spores have escaped, the bracts all turn downwards, and thus greatly alter the appearance of the spike.

Though this is the largest of our native Lycopodiums, yet in some other lands, as in the humid regions of the tropics, and in the United States of America, other species form a very conspicuous part of the herbage, not always creeping along the soil like large mosses, but standing erect, like miniature trees. Even these, however, are small in comparison with the club-mosses of older ages; for the geologist finds in the coal strata large species of similar plants, the Lepidodendrons, the numerous kinds of which must have formed an essential part of the vegetation of the forests of remote epochs. They have, with the ferns and horse-tails, contributed more than any other plants to furnish those beds of coal which form so important a material of our comfort, and which have supplied the immense means for the diffusion of knowledge, science, and manufactures, by means of the steamship, the locomotive, and the printing-press.

Those ancient plants, the Lepidodendrons, have stems of the same essential structure as those of our Club-mosses, are branched in the same way, and have similar leaves and fructification. While, however, our Lycopodiums are so moss-like that the older botanists described them as mosses, the fossil Lepidodendrons must have attained the height of trees, and had thick bases to their stems as large as the trunks of our oaks or firs. Leaves some inches long grew on their stems and branches, and under their shadow were developed those large ferns and horse-tails which are so abundant in the coal-measures, that ferns seem at one time to have formed more than three-fifths of the earth's vegetation. Doubtless they aided by their living growth the purification of the atmosphere, and how much we owe to their decomposed substance no pen can describe. If these gigantic plants are not exactly identical with the modern *Lycopodiaceæ*, yet they are so nearly so that little difference can be discovered by those who have most patiently and skilfully investigated the plants of the coal strata.

Our native Club-mosses have no very great beauty to recommend them to our notice, save the green tint which they give to the hill-side or mountain-slope, or dripping rock or waterfall. They are a peculiarly alpine tribe of plants, *L. inundátum* being the only species frequent in the low lands of the

EUROPEAN BRISTLE FERN.
Trichomanes radicans.

Pl. 311

south-east of England. The stems of all are clothed with leaves densely crowded upon them, and overlapping like the tiles on a roof—an arrangement which the botanist terms imbricated. The fructification is placed in the axils of the leaves or bracts, that is, in the angles between these and the stems; and it generally grows in a cone at the top of the stem. It consists of kidney-shaped capsules, which have from one to three valves. Two distinct substances lie enclosed in the capsules of some species. One kind is a small dust-like powder, composed of smooth grains; and the other consists of three or four globular-shaped fleshy bodies, many times as large as the powder. The powder is produced by all the species of Club-moss; but the larger fleshy bodies occur but in a few, and are not found in the Stag's-horn.

The Club-mosses are called in Italy *Licopodia*, and in Holland *Wolfsklaw*, and the Germans call the plant *Kolbenmos*. In Sweden, wreaths of our common species are commonly worn on festive occasions by the peasantry; and Anna Howitt, when describing the May festival at Starnberg, in Germany, says: "People arrived even faster and faster; there were parties in carriages, with servants and gentlemen; there were parties on foot, the gentlemen with wreaths of ivy or Stag's-horn Moss twisted round their straw or felt hats, with gentians, cowslip, or primula flowers stuck into their buttonholes." Wordsworth alludes to a similar mode of using the moss in the north of England:

"Or with that plant which in our dale
We call Stag's horn or Fox's tail,
Their rusty hats they trim;
And thus, as happy as the day,
Those shepherds wear their time away."

Mr. Matthew Arnold, too, refers to the plant:—

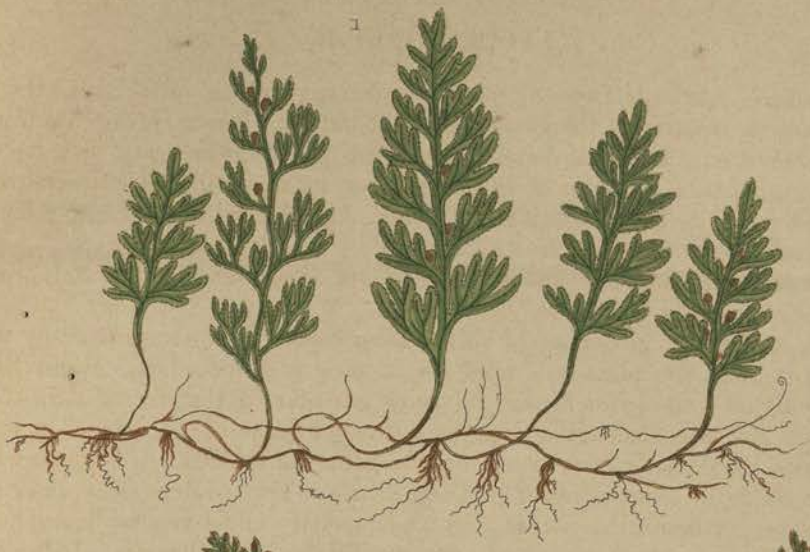
"Under the glittering hollies Iseult stands
Watching her children play; their little hands
Are busy gathering spars of quartz, and streams
Of Stag's-horn for their hats. Anon with screams
Of mad delight, they drop their spoils and bound
Among the holly clumps and broken ground,
Racing full speed, and startling in the rush
The fell-fares and the speckled missel-thrush
Out of their glossy covert. But when now
Their cheeks were flush'd, and over each hot brow
Under the feather'd hats of the sweet pair
In blinding masses shower'd the golden hair,
Then Iseult called them to her."

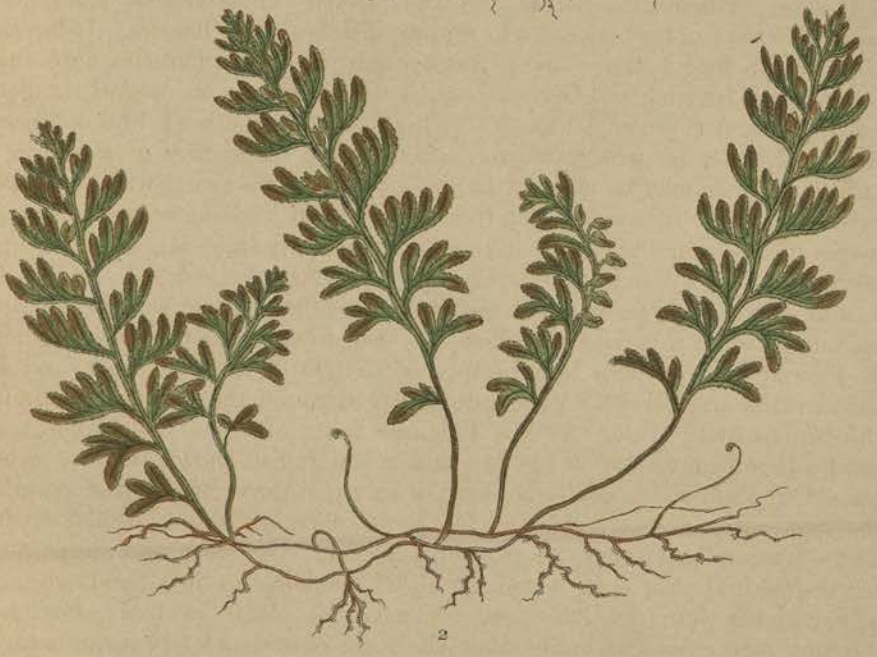
Very pretty ornaments were, in former days, made of the Club-moss for summer stoves, and English ladies seem to have worn it occasionally as a head-dress. Gerarde says:—"Some have made hat-bands, girdles, and also bands to tie such things as they have before gathered, for the which purpose it most fitly serveth." His description of the plant is very graphic: "Some pieces thereof are six or eight feet long, consisting, as it were, of many hairy leaves, set upon a tough string, very close couched, and compact together; from which are also sent forth certaine other branches, like the first; in sundrie places there be sent downe fine little strings, which serve instead of

roots, wherewith it is fastened to the upper part of the earth, and taketh hold likewise upon such things as grow next unto it. There spring also from the branches bare and naked stalks, on which grow certaine ears, as it were, like the catkins or blowings of the hasell-tree, in shape like a little club, or the reed-mace, saving that it is much lesser, and of a yellowish-white colour, very much resembling the clawe of a wolfe; whereof it hath its name." He adds, however, that the "knobby catkins are altogether barren, and bring forth neither seede nor flowre."

The astringent properties of this Club-moss were greatly praised by the herbalists, and the plant was used for a variety of disorders. John Ray mentions that a decoction of the Club-moss was taken in that dreadful disease, the *Plica Polonica*—hence the plant had the old name of *Plicaria;* but it is little used medicinally now, except by the people of the Orkney Islands, who administer it in some diseases of their cattle. The powdery dust (spores) is of a very inflammable nature, and was formerly called vegetable sulphur, being collected for fireworks, and to represent lightning at theatres. It flashes when thrown into a flame; and it was brought in large quantities into this country from Sweden and Germany, until some preparation of rosin superseded its use in representations of this kind. It seems almost impossible to moisten this powder with water, for, when laid on the surface of liquid in a basin, the finger may be plunged to the bottom of the vessel without being wetted. This substance has also been used for ameliorating wines. Several species of Club-moss might remind one of a miniature tree; and Mr. Fortune relates, in his "Wanderings in China," an amusing anecdote referring to a curious dwarf species which he found on the hills of Hong-Kong. He dug up this plant, and carried with him into the town. The Chinese to whom he showed it were quite in a rapture of delight at its appearance, and all the servants and coolies on the spot gathered round the basket, to admire this curious little plant. As Mr. Fortune had never seen them express so much admiration except on one occasion, when he had shown them a cactus called Old Man, he naturally inquired into the cause of their satisfaction at the appearance of the *Lycopodium.* They replied in Canton English, "Oh! he too muchin handsome; he grow only a leete every year, and suppose he be one hundred year oula, he only so high"—holding up their hands an inch or two higher than the Club-moss. "This little plant," says Mr. Fortune, "is very pretty, and naturally takes the form of a dwarf tree in miniature, which was doubtless the reason of its being so much a favourite with the Chinese, who think that a tree attains its greatest beauty when its growth is stunted by their ingenuity."

2. **Interrupted Club-moss** (*L. annótinum*).—Leaves scattered, tipped with a spine, and edged with small serratures; spikes without stalks, terminal; scales roundish, with a tapering point, membranous and jagged. This plant is so local in growth that it is little known in England, though found in Charnwood Forest in Leicestershire, at Rumworth Moss in Lancashire, Teesdale in Durham, Bowfell in Cumberland, and Langdale in Westmoreland. It grows also on Glyder Vawr, on Snowdon, though when seen in 1836, by Mr. Wilson, it had become reduced to a solitary root, and was without fructification. In some districts of Scotland it is very abundant, as





1 TUNBRIDGE FILM-FERN.
Hymenophyllum tunbridgense.

2 WILSONS F-F.
H. unilaterale.

it is in many mountainous regions, especially in the north of Europe, growing on wild open places, at a great elevation, or in pine-woods; it is also plentiful in some parts of North America. Mr. Watson describes it as pretty frequent between 500 and 850 yards on the mountains of Clova and the west of Aberdeenshire; but adds, "I have never seen it above 900 yards, or below 500."

This Club-moss receives its specific name from the somewhat jointed or interrupted appearance of its branches, which arises from the leaves being at shorter intervals and less spreading. The creeping stem sends out, here and there, several upright branches, from one to four inches long; but it is less branched than *L. clavatum*. The length of these is increased every year, and the points of the annual growths are very visible, giving to the stem its interrupted appearance. These upright branches are often again divided, and the spike is usually on the sixth or seventh joint of the branch when fertile, but some branches are barren. This is a large species, sometimes growing even to the height of a foot from the ground; and its narrow leaves, which spread out on all sides of the stems, are arranged in five rows, which, however, are not very distinctly marked. The little saw-edged and stiffly-pointed leaves are without stalks; they are of a yellowish-green colour, and have each a distinct mid-rib. On the older parts of the stem, the leaves not only spread more than on those newly grown, but they sometimes turn downwards.

The spike of fructification is at the top of the leafy branch, without a partial stalk, and about an inch long. It is oblong, and the bracts or scales upon it are nearly round, with a long narrow point, and a jagged membranous margin. When the spores are matured and burst from their capsules, these scale-like leaves turn downwards.

3. **Flat-stemmed Club-moss** (*L. complanátum*).—Stems stiff, wiry, waved, sparingly leaved; leafy branches in clusters, stem flattened, leaves in 2—4 rows of two sizes; spikes one or more, stalked. This species, whose only British stations are in Gloucestershire and Worcestershire, is a plant of the heath-clad hill and stony moor. Its stem reaches a length of a foot and a half; and the two side rows of leaves or its branches will be found to be attached by their base and concave, whilst those of the upper and under rows are free, more awl-shaped and shorter, as well as more erect.

4. **Savin-leaved Club-moss** (*L. alpínum*).—Leaves overlapping each other, in four rows, acute, keeled, entire; spikes terminal; branches erect and clustered. This is a pretty evergreen species, of a much brighter tint than any other of our Club-mosses. It grows in great abundance on the grassy slopes in the hilly and mountainous districts of Scotland, large tracts of ground being rendered of a rich green by its trailing stems. It occurs in England on the mountains of Derbyshire, Yorkshire, and Cumberland, and again in Hants and Somerset, as well as in Ireland. It grows in several Welsh localities, as at Carnedd David, in Carnarvonshire, at an elevation of 3,000 feet. On the northern mountainous regions of Europe, as in Lapland, Sweden, Norway, Russia, Germany, and Switzerland, it is a common plant, as it also is on the high lands of Canada.

This species is regarded by Sir Joseph Hooker as a sub-species of *L. complanatum*, from which it differs in several points. Its English name was

given from the resemblance of its branches, with the leaves pressed closely around them, to those of the savin (*Juníperus sabína*). The roots are very strong and wiry, and are formed of branched, downy, stout fibres. The stem creeps close to the surface of the ground, and bears, at irregular intervals, several upright branches, which are repeatedly divided in a forked manner, forming a close tuft, level at the top, and somewhat fan-shaped. These are shorter than in *L. complanatum*, not flattened, and the leaves are all of one kind. These are lanceolate and pointed, the edges without serratures, and they are somewhat boat-shaped, being hollowed out in front where they fit the stem. The leaves overlap each other, and are in four rows, the branches having a somewhat square form. Those branches bearing the spikes of fructification are rather longer than the barren ones, and twice forked. The spikes as a rule are solitary, and have no distinct stalk. The scales are membranaceous, flat, broad at the base, tapering upwards and pointed, and placed very closely together. Between each scale and the stem lies a pale yellow, kidney-shaped capsule, filled with minute, yellowish spores. When these are dispersed the scales turn downwards, and the spike bends down into a semicircular form. This plant is said, by Sir W. J. Hooker, to be used in several countries to dye woollen cloths of a yellow colour. In Ireland, cloth is commonly dyed by boiling it with the Lycopodium, and with the leaves of the bog whortleberry. The flavour of this Savin-leaved Moss is bitter and somewhat aromatic.

5. **Marsh Club-moss** (*L. inundátum*). — Stem creeping; branches simple; leaves and scales linear, acute, curved upwards; spikes solitary. Though this plant is rare in Scotland, and the midland and northern counties of England, it is less so in the south, though always local. In Ireland it is very rare. It may be often seen on moist heathy moors, especially where the surface has been pared for turf-growing, amid gorse and broom, not usually forming a mossy tract of wide extent, but occurring here and there, in patches, all over the bog. It is not so conspicuous a plant as to be noticed by many except botanists. Its habit is prostrate—the stem, which is two or three inches long, being closely pressed to the surface of the soil, and attached to it by a few short, but stout, tough, and branched fibres. The branches are simple, the barren ones lying along the ground; the fertile ones upright. All parts of the plant are thickly covered with narrow leaves without serratures, but acutely pointed; those leaves which are on the barren stems all curving upwards. This plant, during the period of its growth, lengthens at the point, the other end gradually decaying. The winter, which stops the growth, does not arrest the decay, so that little is left of the stem to produce the next year's foliage, while the withered remains of summer look like a number of black marks or lines among the short grass of the heath in spring, resembling a plant which has been scorched and blackened by fire. The green portion of the Club-Moss is very small at this season, for many plants perish wholly in the winter, and it is only the vigorous ones which may now be seen putting forth their new leaves. The spikes of fructification are produced in autumn, each being at the top of a footstalk rather longer than itself, and nearly of the same thickness; and, as well as the spike, being surrounded by green linear scales rather larger at

FLOWERING FERN.
Osmunda regalis
a. Natural size.

Pl. 313.

the base, and sometimes having one or two minute teeth at the sides. The capsules lie between the scales and the stem; they are of a pale yellowish-green, and filled with yellow dust-like spores.

6. **Prickly Club-moss, or Mountain Moss** (*L. selaginoides*).—Stems procumbent; leaves lanceolate, acute; spikes solitary; scales egg-shaped. This plant is not in any degree prickly in the true sense of the word, and, indeed, its smaller degree of rigidity renders it less so to the touch than most of the species. Its stem is creeping, two or three inches long, very weak and slender, lying close to the ground, and repeatedly branched. The whole plant is covered with lanceolate delicate leaves, their margins beset with small spiny teeth. The fertile branches differ from the winding barren ones in their erect growth, the barren ones being quite trailing. The former have also their leaves longer and more pressed to the stalk, and the terminal spike of fructification is about an inch long. This is thickly covered with scales, pressed close to its surface, and having their edges jagged with spiny teeth. This is the only British species bearing both the kinds of fructification alluded to in the description of the genus. The lower scales have the pale yellow capsules seated at their base, containing three or four large spores, equal in size to the seeds of many flowering plants; and the capsules of the upper ones contain the dust-like powder which agrees with the spores of the Lycopodiums in general. The spike is annual, decaying immediately after the dispersion of its contents. This is a more northern species than the last, it being generally distributed over the bogs and marshy grounds of Scotland and the north of England, coming only as far south as Lincoln, Derby and Chester. It also occurs in Wales and Ireland. In the Highlands of Scotland it reaches an altitude of 3,300 feet. Also known as *Selaginella selaginoides*.

7. **Fir Club-moss, Upright Fir-moss** (*L. selágo*). — Stem erect, with forked branches; leaves in eight rows; fructification axillary. This is among our most generally distributed Club-mosses, and is more frequent in this kingdom than any species except the common Club-moss. It often grows on the summits of lofty mountains, as on Snowdon, and on the "dark brow of the mighty Helvellyn"; yet it is a common plant, too, on the heathy lands of lower districts. It is a moss of old repute among the Highlanders, Selago being the ancient name of some succulent plant, and derived, according to De Theis, from the Celtic *sel*, sight, and *jach*, salutary, because useful in complaints of the eyes. From the same root, *sel*, was formed *Selma*, the name of Fingal's Hall, which corresponds to the modern name Bellevue. The plant is still used in the Highlands, where it is made into an irritating ointment, which is rubbed on the eyelids with good effect in some diseases of the eye, and an infusion of this Club-moss is considered by the Highlanders a valuable medicine for several disorders; but it should be used with caution, for its properties are powerful, and too large a dose causes giddiness, and even convulsions, while it is sufficiently caustic to serve as a blister to the skin. It is also used in Skye and some other places, instead of alum, to fix the dye; and Linnæus mentions that it is employed by the Swedes to destroy vermin.

The Fir Club-moss is not difficult of recognition, even to the unpractised

botanist. It usually grows, at first, in a much more erect position than any other native species, though, after a time, it becomes in some measure trailing. Its fructification, too, differs from that of the others, not being arranged in terminal catkin-like spikes, but being produced in the axils of the leaves along the upper branches of the stem. The stems are from three to six inches in height; the plant attaining occasionally, in sheltered situations, a still greater size. One stem only issues from the root, and this is branched two or three times in a forked manner, till it forms a cluster, which is flat at the top, and has from six to ten alternate divisions. The branches are very tough and rigid, their thickly crowded leaves overlapping each other. These little lanceolate leaves are acute and glossy, smooth on the edges, very stiff, and of a rich green colour.

The capsules of fructification are rather large, kidney-shaped, two-valved, and filled with pale yellow minute dust-like spores. The plant likewise forms buds, and seems chiefly propagated by their means. These curious little stalked buds consist of three or four egg-shaped leaves of different sizes, placed in the axils of the leaves, chiefly towards the summits of the branches.

Order CIV. MARSILEACEÆ—PEPPERWORTS.

These are flowerless plants, bearing capsules without a ring, either enclosed within the swollen base of the leaves, or rising from the rootstock of the plant, and containing *macrospores* and *microspores* attached to thread-like receptacles.

1. QUILLWORT (*Isoétes*).—Capsules surrounded by the bases of the hollow leaves, containing two sorts of spores, some larger than the pollen-like dust which accompanies them. Name from *isos*, equal or alike, and *etos*, the year, because evergreen.

2. PILLWORT (*Pilulária*).—Capsules globular, 2—4-celled, each cell containing two different kinds of bodies. Name *pilula*, a little pill, which its fructification resembles.

1. QUILLWORT (*Isoétes*).

1. **European Quillwort, or Merlin's Grass** (*I. lacústris*).—Leaves awl-shaped, bluntly four-sided, with four-jointed tubes. The Quillworts are aquatic plants, and our only native species of the genus is abundant at the bottom of lakes and ponds in some hilly districts. The plant renders such a spot very beautiful, as, when seen through the crystal waters, it looks like a meadow of the richest green hue, and, as it is perennial, it adorns them at all times of the year. It occurs in lakes, reservoirs of water, and on marshes and other inundated places in the north of England and Wales, and is frequent in some of the Scottish lakes. Mr. Knapp, remarking on the soil of the Highlands, says that a considerable portion of it is formed chiefly by the granite of rocks, the felspar, quartz, and mica having been disintegrated by the elements, and mingled with a little vegetable earth; and that the

1 MOONWORT.
Botrychium lunaria.

2 COMMON ADDERS TONGUE.
Ophioglossum vulgatum.

3 LESSER A T
O lusitanicum

roots of plants and the lower leaves are generally sprinkled with glittering specks of mica. "So general," says this writer, "is the diffusion of this micaceous earth through Scotland, that we have found the roots of *Isoétes lacústris*, digged up from the bottom of Loch Lomond, partaking of this tribute from the mountains, though in an inferior degree to a truly alpine plant."

The Quillwort occurs in the marshy lands and waters of several parts of Europe, and seems more abundant in Sweden and Denmark than elsewhere. In France the plant is called *L'Isote des étangs*, and in Germany *Der Brachsemfarrn*. Mr. Gardner, when in Brazil, collected, from a marsh by the side of a river, specimens of a Quillwort which appeared to be identical with the British species, and adds: "The sight of this plant recalled pleasing recollections of long-past times, and I could not refrain from indulging in a lengthened train of reflection, which ended by comparing it with myself—a stranger in a strange land, and associated with still stranger companions." The Quillwort occurs also in the northern parts of North America.

To those unacquainted with the plant, its long quill-like leaves would seem, when growing in the water, to be those of some kind of grass, which by its ready growth was quite filling up the pool. It abounds in some of the lakes of Denbighshire, and in those of Llanberis; and at Rydal and the other Westmoreland lakes, and in waters near Coxwold, in Yorkshire, as well as at Prestwich Carr in Northumberland, it has long been known and admired for the beauty and greenness which it gives to the still waters. It is found at an elevation of 2,000 feet in the Highlands.

At the base of the long awl-shaped leaves of this singular plant is a roundish corm, which is brown and spongy on the outside, but is, within, white and firm. From these tubers descend a number of long, tubular, somewhat pellucid roots, which are sometimes forked at their extremities. Some botanists have eaten these tubers when young, and consider them to be perfectly innocuous, though having an earthy flavour. The leaves, which arise from the crown of the tuber, are of a somewhat olive-green colour, very brittle, and from four to seven inches long; they are dilated at the base, and clasp around the inner leaves, and their margin is membranaceous. The upper part of the leaf is nearly round, and formed of four hollow tubes, separated from each other by the transverse partitions, which give to the plant its jointed appearance. They taper at the upper part into a sharp point. It is within these broad bases of the leaves that the fructification lies concealed. The capsules are round and hard. Some of them contain roundish bodies, which finally separate into three triangular valves. The other set of capsules contains extremely minute pollen-like spores.

There are two forms of this Quillwort found in our waters; one—the type—having leaves slender, erect, and densely tufted, the other (*I. echinospora*), having them thicker, shorter, paler, and more spreading; but whether these are distinct species, or whether their variation is referable to some accidental circumstance in the conditions of their growth, seems uncertain.

The Quillwort cannot always be easily gathered by botanists, though in some ponds fish root it up, and, leave portions of it at the edge of the water. They are said to feed upon the plant. It is also most eagerly devoured by

cattle when placed within their reach, and is believed to be very nutritious food for them.

2. **Porcupine Quillwort** (*I. hystrix*).—Leaves thread-like, the tubes obscure, and the sheath quite enveloping the capsule. This is a much smaller plant than the common species, and instead of growing at the bottom of lakes, this is found on moist sandy soil that is subject to occasional inundation. It gets its name from the fact that the corm is clothed with the horny prickly bases of the old leaves. The slender leaves are erect only for about two-thirds of their length, then they curve over outwardly. The macrospores, which are white, are studded with blunt tubercles. So far the only locality recorded for this plant in the British Isles is in Guernsey, where it was found in 1860 by Mr. George Wolsey, to whom we are also indebted for the discovery of the lesser adder's-tongue. It fruits in May and June. Also known as *I. duricæi*.

2. Pillwort (*Pilularia*)

Creeping Pillwort or Pepper-grass (*P. globulifera*).—Leaves thread-like; stem creeping; capsules slightly stalked, roundish, and hairy. This plant winds along the grass of wet meadows, or in the mud at the margins of lakes or pools, making little show on the moist lands when inundated with the winter's rains, but lying during summer more or less exposed to view. It is, however, easily overlooked, and was long unnoticed by several of our most eminent botanists, though it grew in abundance in the neighbourhood in which they resided. The Rev. W. T. Bree found it at Coleshill Pool, in Warwickshire, in so great plenty, that he says he has seen it covering the shore to a great extent; yet Mr. Purton remarked, some years since: "This must be the rarest of our indigenous plants, as it is not mentioned in the Cambridge, Oxford, or Bedford Floras; nor is it noticed as a Warwickshire plant in that accurate and laborious work, Dr. Withering's 'Arrangement.'" It is now known to be not uncommon. It grows on the marshes near Penzance, in Cornwall; about Polwhele, Devonshire; at Maiden Down, in Somersetshire; near Warminster, in Wiltshire; on Esher Common, and at Roehampton, Surrey, and a large number of well-known localities—being distributed here and there over most parts of the kingdom. In Ireland it is found but rarely in the west and north-east. It is familiar to botanists throughout the greater part of Europe. In France it is *La Pilulaire*, in Germany *Pillenfarrn*, whilst it is the *Pillenkruid* of the Dutch.

This plant is never found in deep water, but forms verdant masses on places occasionally overflowed. Its long entangled stem is hollow, and not larger than a stout thread; and its younger portion is invested with small scale-like hairs. It is occasionally branched; and issuing from it, at intervals of half an inch or more, are small tufts of slender roots, which descend into the soft soil. Three or four fibres are in each tuft, and immediately above each set of fibres rises, from the upper part of the stem, a tuft of from two to six thread-like leaves. These leaves are hollow, bristle-like, about two inches long, and bright green. They are divided into cells, and, when young, are rolled up like the leafy ferns: they unroll gradually, at first hanging down like a shepherd's crook, but by degrees they become erect.

1 COMMON CLUB MOSS.
Lycopodium clavatum

2 INTERRUPTED C. M.
L. annotinum

3 SAVIN-LEAVED C. M.
L. alpinum

4 MARSH C. M.
L. inundatum.

5 LESSER ALPINE C. M.
L. selaginoides

6 FIR C. M.
L. selago.

Pl. 315.

The capsules containing the spores are placed on short stalks just at the base of the leaves, in the angle formed by the leaf and stem. They are about the size of a peppercorn, and closely covered with jointed hairs of a light-brown colour. They consist of four cells, and, when quite ripe, split open from the upper part into quarters, which still remain on the little stalk. The spores are placed along the centre of the valves, forming four rows; and the lower part is occupied by granular bodies, and the upper by pollen-like powder. The larger grains are the macrospores, and the smaller microspores. The macrospore develops into a prothallus upon which arises an archegonium, which is fertilized by the contents of the microspore.

Order CV. EQUISETACEÆ—HORSETAILS.

These are leafless, flowerless, sometimes aquatic plants, with a hollow subterranean, creeping stem, and erect hollow fronds marked with lines, and sheathed at the bases of the joints. The fructification is produced in terminal spikes or catkins, either placed on the stem of the branched frond, or on a separate simple frond of earlier growth.

HORSETAIL (*Equisétum*).—Stems jointed and tubular, fertile ones mostly unbranched and succulent; barren stems with whorled branches; fructification in a catkin. Name from *equus*, a horse, and *seta*, a hair, because some of the barren fronds resemble the tail of a horse.

HORSETAIL (*Equisetum*).

1. **Cornfield Horsetail** (*E. arvénse*).—Barren stems, with few furrows, slightly rough; branches rough, with three or four simple angles; fertile stem unbranched, with few loose distant sheaths. This is by far the commonest of our native Horsetails, some of which are known to all who observe the plants which grow wild. These plants are commonly called Jointed Ferns, or Leafless Ferns, though they have not a very obvious affinity with the leafy species commonly recognised as ferns. They are destitute of any green expansions; they are jointed at regular intervals, the joints or knots being solid, and surrounded by membranaceous toothed sheaths, while the portions between the joints are hollow. Their branches are rigid and whorled, and the fructification placed in cone-like heads made of scales, to the lower face of which the spore-cases are attached in a row round the margin.

The stem is chiefly composed of cellular matter, but towards the outer portion there is a layer of woody fibre. The cuticle, or thin skin, which covers the Horsetails, is in all the species regularly and beautifully coated with particles of flint, arranged in lines and other forms, often not the five hundredth part of an inch in diameter. These particles were discovered by Sir D. Brewster to lie, in the greater number of cases, in simple straight lines; but others are grouped into oval forms like the beads of a necklace, and connected together by a minute chain of particles.

The Horsetails are readily distinguished by their leafless stems and the

hollow angular channelled branches, which are in most cases whorled around them. The different species are not, however, always very readily discriminated, several of these being very similar, and the structure of the sheaths around the joints, and the ridges on the surface of the stems, often form the chief features of their distinction.

The Cornfield Horsetail is not, like most of the species, peculiar to marshy soils, but springs up everywhere, and is not only an annoyance to the farmer, who finds it difficult of eradication from his corn or pasture lands, but is also often a troublesome intruder into the garden. Most of us have amused ourselves in childhood by giving a sudden pull to the stem or branch, and thus separating it into small portions, leaving the sheath in which each portion was enveloped disclosed to view, and needing no microscope by which to discover its little sharp membranous teeth. This species has a long creeping root-stem, which is hollow, very much branched, and jointed like the stem which rises above the ground; and it throws out at each joint a whorl of tough fibrous roots. It has two kinds of fronds, the one fertile, and without branches; the other barren, and surrounded by the green whorls of rigid branches.

The fertile stem rises above ground in March, and is matured by April or May, at which season the barren stems may often be seen, lately emerged from the earth, arrayed in the most delicate green colour, and very brittle. When the fertile stem has attained maturity, it is, when growing on soils suitable to it, about eight or ten inches high, but it is more frequently about half that height. It is hollow, succulent, pale brown, without furrows, and divided at intervals into joints; the length of the spaces between the joints is very variable, the joints at the lower part of the stem being usually closer together than at the upper. The sheaths are yellowish at the base, and have about ten dark-brown or black slender teeth, with very sharp points. The upper sheaths are longer than the lower ones, and the black teeth are often tipped with white, and have a clear white margin.

The cone-like fructification is at the top of the stem, and is about an inch long, tapering upwards, terminating in a blunt point, and standing on a distinct foot-stalk about half its length. It is of a pale, or sometimes of a reddish-brown colour. The capsules are attached to round scales, and arranged in whorls around them. The number of scales varies, but they are not so numerous in this species as in some others. In May, when the catkin is matured, and sheds its numerous fine green spores, these, like the spores of other species, are, by the aid of the microscope, seen to be surrounded by delicate threads, which uncoil with such curious movements, that when looking at them we can scarcely persuade ourselves that the motion is purely mechanical, and is not the result of animal life. The oblong capsules, when ripe, open by two valves, and discharge their powder-like spores or seeds.

The barren frond of this Equisetum is a very different-looking plant, and is handsomer than the fertile one. When first it rises, it seems merely a hollow pointed stem, for its branches are not then seen. It is, however, when fully grown, two or two and a half feet high, and has whorls of long, green, rigid, and four-angled branches, either half-way down, or throughout its whole length, and two or more fronds rising from the same part of the

1 EUROPEAN QUILLWORT.
Isoetes lacustris

2 CREEPING PILL WORT.
Pilularia globulifera

Pl. 316.

creeping stem. In shady situations, as when overtopped by the rising corn, these deep green branches become very long and scattered; but in the drooping attitude which they assume, and in the close growth of ordinary specimens, they are thick enough to remind us of the tail of a horse, and in some cases they are again branched. The stem is slightly marked with from six to nineteen furrows, and both stem and branches are rough with the minute particles of flint with which they are coated. The sheaths also are furrowed, and their ribbed wedge-shaped teeth have often a white thin line round the margin.

This rigid plant is a very unwelcome intruder on the pasture-land, as cattle, except when pressed by hunger, leave it untouched, and when eaten it is said in some instances to have proved very injurious, though sheep and horses seem to eat it with impunity. It sometimes runs all over the land, and is most difficult of extirpation. It is equally common in other parts of Europe, as well as in Asia and North America. It is in France called *Prêle;* and this, or some very similar species, is the *Kannenkraut* of the Germans. The Dutch call some common Horsetail *Akkerig paardestaart;* and these plants are the *Equiseto* of the Italians and Spaniards, while several of the species are commonly known in Cochin-China by the name of *Mahoang*, and are called *Chwostch* by the Russians. The Horsetails are found in every latitude except the high south, abounding in northern temperate regions and a few being found in sub-tropical parts of America and Asia, and at the Cape of Good Hope.

Our native species were, by the old writers, termed Shave-grasses, and as this Corn Horsetail has much of the roughness given by the particles of flint, and as it is the most frequent species, it is probably the plant sold in Queen Elizabeth's time by the "Herbe-women of Chepeside," under the names of Shave-grass and Pewter-wort, or Vitraria, though it would doubtless have been considered inferior to the *E. hyemâle*, which Gerarde calls "the small and naked Shave-grass, wherewith fletchers and combe-makers doe rub and polish their worke." It was very serviceable in the kitchens of olden times, and was doubtless used for cleaning the wooden spoons and platters, the "breen" of our forefathers, as well as the "garnish" of pewter. Although in early days the tables of the opulent were served with silver, yet in humbler households wooden articles were commonly used at the daily meals, until the fifteenth and sixteenth century, when pewter came into general use among the higher classes; though not until the beginning of the eighteenth century were the articles made from it sufficiently cheap to admit of their being seen at any save the rich man's table. Harrison, referring to this in 1580, says that in some places "beyond the sea, a garnish of good flat pewter of an ordinarie making is esteemed almost so pretious as the like number of vessels that are made of silver, and in maner no less desired amongst the great Estates, whose workmen are nothing so skilful in that trade as ours;" and the prices which he gives of the various articles prove their great costliness. The Shave-grasses served for cleaning either kind of ware; and this Corn Horsetail is still used by the dairymaids in Yorkshire for cleansing wooden milk-pails; while the larger and less frequent plant, the Rough Horsetail, has long been known to our polishers of marble and

other similar substances, and, under the name of Dutch Rush, has been imported in large quantities from Holland for their use.

2. **Rough Horsetail, Shave-grass, Dutch Rush** (*E. hyemale*).—Stem erect, rough, strongly marked with lines, usually biennial or perennial; sheaths short, pressed close to the stem; teeth falling off. This species has not, like the last, two distinct kinds of fronds, those which bear the catkins being, in all other respects, exactly like those which are barren. It has none of the whorled tail-like branches around the main stem, though now and then a single branch is produced from the base of one of its sheaths. Its roots are strong and black, and its creeping underground stem extends to a great distance, and is jointed and branched by the whorled fibrous roots. The main stem of the frond is usually erect, two or three feet high, hollow, tapering towards the summit, and marked with from eight to thirty-four ridges. These ridges render the stem so rough to the touch that they are like a file, and their crystals of flint display, under the microscope, the most exquisitely beautiful arrangement. They abound both in the inner and outer cuticle, and form a complete framework to the plant. By some chemical process, the silica may be wholly freed from the vegetable portion, and the entire form of the stem and branches of the Horsetails preserved in beautiful clear crystal; and when the vegetable remains are washed after the process, they are found to be quite free from a single particle of flint. The sheaths of this species clasp the stem quite closely, and are marked, though less strongly, with the same number of ridges. Black membranous bristle-shaped teeth, equal also in number to the ridges, terminate the sheath, soon disappearing, and leaving its margin indented with roundish notches, though the teeth of the sheath just beneath the cone remain. The teeth, which are at first pale glaucous-green, become afterwards black; they are pale in the middle, and have a deep black ring both at the top and base of the sheath.

The catkin of this plant is small, and of a dark colour, and usually terminates the deep green stem; or, if placed at the side, is never at any great distance from its summit. The scales, which are from forty to fifty in number, are marked with two or three lines.

This is not a common species, and is apparently very local in those counties in which it occurs, while it is almost unknown in the midland and southern parts of England. It has been found in moist woods at Hawthornden, Durham; in the neighbourhood of Newcastle; in Cumberland and Westmoreland; near Scarborough, in Yorkshire, and several other northern localities; also in South Kent, and in several places in Ireland, Wales, and Scotland. It is common in many moist lands and woods in some continental countries, as in Germany and Switzerland. In Holland it grows in plenty, and attains great luxuriance on the numerous embankments and by the sides of canals; and the large quantity of the plant brought annually to the London market has led many botanists to think that its culture along our sandy coasts would be of value from a commercial point of view, and that at the same time it would form a firm soil at the margin of the waters. Mr. Francis, who observes that on such places it would grow rapidly and luxuriantly, and would yield a considerable profit, adds: "The Dutch are well

1. CORN HORSETAIL
   Equisetum arvense
2. ROUGH H.
   E. hyemale
3. SMOOTH NAKED H.
   E. limosum
4. MARSH H.
   E. palustre

acquainted with the value of its long and matted roots in restraining the wasting effects of the ocean, which would soon undermine their dykes, were it not for the *Equisétum hyemále* which is planted upon them." Either this, or some other species, was also highly commended for medicinal virtues, and the expressed juice put into the nostrils, and applied at the same time on the neck, was said to stop the bleeding of the nose. The fresh juice is also used externally as a remedy for wounds. There is a var. *moorei* with annual stems, the sheaths loose and their teeth blunt with white tips; this variety has been reported from Wicklow.

3. **Water Horsetail, or Smooth Naked Horsetail** (*E. limósum*). —Stem erect, smooth, naked, or branched; sheaths shut, closely pressed to the stem; teeth numerous. Many lovers of stream-sides, of the music of rippling waters, and the beauty of wild flowers, have seen this plant fringing the stream, and mingling with its forget-me-nots, willow herbs, and golden flag flowers. It is not infrequent, and is found occasionally in running streams, but is more often to be seen in pools and ditches, its stems standing up in the water or around it, sometimes a yard high. The stem of the Smooth Horsetail is marked with from ten to thirty distinct ribs, but they are not so raised as to render it harsh to the touch, and their flinty coat is thinner, and formed of more delicate particles than that of some other species. Some of the stems are quite without branches; others have, about the middle, irregular whorls of branches; sometimes there is about half a whorl here and there; in other cases there is a single branch; so that the plant exhibits the most irregular and scattered mode of branching; but the branches are never long and spreading like those of the Corn Horsetail, nor are they ever rough. The presence of the catkin on the fertile stem forms the only difference between it and the barren one. This is terminal on the main stem, or more frequently on some of the uppermost branches, and it is bluntly egg-shaped. The scales, which are more than a hundred in number, are black, and the capsules are pale coloured. The numerously-toothed sheaths are very short.

This plant is so much less flinty in its nature than either of the other species, that it is better fitted for fodder for cattle in this country, though it does not seem to be relished by them while in a green state; but Linnæus says, that in Sweden it is cut up for their food, and that the reindeer feed on it when dried, though they will not eat common hay. Mr. Knapp, who, in his "Journal of a Naturalist," remarks that it is a favourite food for the common water-rat, adds: "A large stagnant piece of water in an inland county, with which I was intimately acquainted, and which I very frequently visited for many years of my life, was one summer suddenly infested with an astonishing number of the short-tailed water-rat, none of which had previously existed there. Its vegetation was the common products of such places, excepting that the larger portion of it was densely covered with its usual crop, the Smooth Horsetail. This constituted the food of these creatures, and the noise made by their champing it we could distinctly hear in the evening at many yards' distance."

4. **Marsh Horsetail** (*E. palústre*). — Stem erect, with numerous branches, rough; sheaths long and loose; teeth long and few. This is a very

common species, growing often in great abundance near standing water, and covering places where water has been drained, or growing among the wild flowers of the bog, and reminding us of Clare's lines :—

"Here Horsetail round the water's edge
In bushy tufts is spread,
With rush and cutting leaves of sedge
That children learn to dread ;
Its leaves like razors, mingling there,
Oft make the youngster turn,
Leaving his rushes in despair,
A wounded hand to mourn."

The creeping underground stem of this species is nearly as large as the stem of the frond, black, and smooth, and has tufts of black fibres descending from it. The main stem of the frond is perfectly erect, about fifteen inches high, with five to twelve prominent ribs and deep furrows, rough to the touch, though less so than in some of the species, and whorled throughout, except at the base, with numerous branches. The joints are invested with nearly cylindrical sheaths, which, being much larger than the stem, loosely clasp it, some of the upper ones being nearly twice as large as the stem itself. The number of marginal teeth on the sheath is the same as that of the ribs on the stem. They are light-coloured, with black or light-brown tips, and membranous margins. The fertile and barren stems are alike, their branches greatly varying in length in different circumstances. The cone of fructification is slender, about an inch long, and standing on a footstalk. The whorls of scales are, at an early period, crowded into a black mass, but after a while are quite separated, showing the white capsules attached to the margin. In June, when these catkins are fully ripened, they become of a brown colour, and, after discharging the spores, wither away ; but the bright green whorls of rigid branches remain green till late in the autumn.

There are some singular varieties of this plant, which, however, appear to be dependent on soil and situation, and not to become permanent. One form has been termed *polystachya*. Instead of the one cone usually placed, in the ordinary form of the Horsetail, on the central stem, several of the branches of the two upper whorls terminate in cones, which are usually darker coloured than the commoner cone, more compact in form, and appear later in the season.

Another, and rarer variety, called *alpina* or *subnudum*, is very much smaller than the ordinary plant, scarcely more than three or four inches high, having the lower part of the stem prostrate, and the branches only about the base of its stem. It is apparently but a dwarfed condition of the plant, probably caused by want of nutriment, the result of growth on a soil less favourable to luxuriance, or of having been cropped by animals.

5. **Wood Horsetail** (*E. sylváticum*).—Stem erect, branches compound, bending downwards ; sheaths loose ; catkin blunt. This pretty species differs so much from our other Horsetails, that it is readily distinguished even at a glance. Its pale green fronds are by far the most elegant and graceful of our native species. In wet sandy places in the north of this kingdom the plant is not infrequent, and it must be described rather as local than rare in this country. In Germany and Holland it is very common ; it

1. BRANCHED WOOD HORSETAIL Equisetum sylvaticum
2. BLUNT TOPPED II E. umbrosum

grows, too, in Prussia and Switzerland, as well as in North America and Northern Asia. It is found at a greater altitude than any other species. It is plentiful in the Highlands of Scotland and in the north of Ireland, and also in several parts of Yorkshire and other northern counties; and is found occasionally in some southern localities, as on Apse Heath, Isle of Wight, and at times in Kent, Surrey, Sussex, Devonshire, and other counties. Mr. Newman mentions that it grows in the Hampstead and Highgate woods. and says that it is remarkable that it was seen there as long since as the time of Lobel. He adds: "In Scotland I observed it growing with peculiar luxuriance in the vicinity of Loch Tyne, in a little fir-wood on a hill-side. The fructification had entirely disappeared, and each stem had attained its full development, and every pendulous branch its full length and elegance. Altogether I could have fancied it a magic scene, created by the fairies for their especial use and pleasure. It was a forest in miniature, and a forest of surpassing beauty. It is impossible to give an idea of such a scene, either by language or illustration." Sir William Hooker likened such a group to a miniature grove of larches.

The brown creeping stem of the Wood Horsetail is branched, and is tufted with fibrous roots. This plant has two kinds of fronds; they have both erect stems; and both, when fully grown, are surrounded by compound branches, though these are fewer on the fertile than on the barren stem. The fertile stems are at first quite without branches, but these soon develop themselves, and are generally from six to eight in number. The stem is from half a foot to two feet in height, of a dull faded-looking green colour, succulent, and having from ten to eighteen slender ridges, with corresponding furrows. It is not so rough nor so firm as in most of the species, on account of the extreme minuteness of the flinty particles in the cuticle. The margins of the sheaths are cut into three or four lobes, and the sheaths are large and loose; the lower half are pale green, and the lobes of a bright brown colour, and they are marked with the same number of ribs as the stem. The whorled branches are slender, about two inches long, curving downwards; and a marked feature of this species is, that these branches have other branches growing at their joints. These secondary branches are from half an inch to an inch long. The cone, which is matured in April, is long, somewhat tapering, and of a pale brown colour, standing on a slender stalk longer than itself. The scales are more than eighty in number, and when ripened disperse a great number of pale greenish-coloured spores. The cone dies away long before the stem or branches have begun to wither, but it is rarely seen for this species does not often bear fruit.

The barren stems, which are of a much less succulent nature than the fertile ones, are taller and more slender, and bear more branches; their sheaths, too, though similar, are smaller, and fit the stem more closely, and their ribs are more strongly marked. The compound branches are often crowded on the stem, the side branches being about four inches long, and bearing at every joint a whorl of branches about half that length. Sometimes these are again branched, and drooping down in whorl beyond whorl the frond becomes exceedingly elegant, narrowing upwards to a slender point which droops too with the weight of lengthening branchlets. The termin-

branches are three-ribbed, and somewhat triangular in form, and each joint is terminated by three long pointed teeth of the same colour as itself.

6. **Shade Horsetail, or Blunt-topped Horsetail** (*E. umbrósum*).—Barren stem very rough, particularly above; branches simple; fertile stem either unbranched, or with simple branches and larger sheaths. This species has not hitherto been found in many places in this kingdom, though it occurs in marshes in some parts of Yorkshire, and about the Westmoreland Lakes; at Wynch Bridge, Teeside, Durham; near Warkworth, in Northumberland; near Mere Clough, Manchester; as well as in several Scottish habitats; and in the mountain glens of Antrim, in Ireland. It was first discovered in the latter locality by Mr. T. Drummond, and hence this plant was formerly termed *E. drummondii*, but it has since been ascertained to be the species called, by Willdenow, *E. umbrósum*, and by Ehrhart, *E. pratense*.

This species has three kinds of stem: one bearing fructification only, a second bearing both fruit and branches, and a third with branches only. The fertile stems are rigid, about six inches high, of a pale sea-green hue, and with large, loose, and remarkably white sheaths, having a brown rim at the base of the teeth. These are long, narrow, and sharp, and are pale brown with white edges. The oval catkin, composed of forty or fifty scales, is at the top of the stem, and of a light brown colour; at first seated on the topmost sheath, but shortly rising on a footstalk. It is matured in April.

The branched fertile stems have sheaths midway in size between those of the two other kinds of fronds. Whorls of branches are produced at the uppermost joints. The cone, which is terminal on the stem, is smaller than in the ordinary form of the fertile frond, while the number of branches is fewer than in the barren stem.

The barren stem is erect, and from eighteen to twenty inches in height; it is very rough, and has about twenty sharp ridges. A few joints at the base are without branches, the joints on the higher part of the stem producing whorls of from ten to sixteen drooping branches, which gradually spread so as to form larger circles. The sheaths are smaller than those of the fertile stem, clasping it more tightly, and have teeth similar in colour, but shorter, fewer, and less prickly. The slender branches are about four inches long, 3- or 4-ribbed, and their loose sheaths terminate in three or four short, sharply-pointed teeth, tipped with pale brown.

7. **Great Horsetail, Great Water Horsetail, or Great Mud Horsetail** (*E. telmatéia*).—Barren stems erect, with thirty to forty branches in each whorl; fertile stems with loose sheaths. This is the largest of our British Horsetails. It is a very graceful plant, and when growing in any quantity, it might remind one of those pictures of oriental palm-groves familiar to all readers of Eastern travel. It is the barren stem of this Horsetail which is so handsome, growing erect to a height of six or seven feet, decked from its summit nearly to its base with spreading whorls of delicate green branches; and few would see a luxuriant specimen on the stream-side without admiring its grace. On the stouter part of this tall stem the whorls consist of from thirty to forty branches, which are again branched. The whorls on the upper part are very numerous, and the branches six or eight inches long; but towards the base the whorls are more distant, and

1 GREAT WATER-HORSETAIL.
Equisetum telmateja.

2 VARIEGATED ROUGH H.
E. variegatum

the branches shorter. The stems, which are pale green, are at their thickest part of the size of a stout walking-stick, gradually tapering upwards, and becoming very slender at the top. Their smooth surface is delicately marked with from twenty to forty lines, which, running on into the sheaths, become there more distinct. The sheaths are about half an inch long, the lower part green, the upper encircled by a dark brown ring, and they fit the stem closely. The teeth are slender, dark brown with white edges, and often growing in twos or threes together. The branches have frequently at their second joints from two to five secondary branches; and their sheaths terminate in four or five teeth, each of which extends into a slender black bristle with two toothed ribs, a character which is very useful in determining the species.

The fertile stems of this species are much shorter than the barren ones, rarely exceeding a foot in height. They are succulent, reddish-white, smooth, and unbranched, with large, loose, funnel-shaped sheaths, the lower ones smaller than the upper. These sheaths, which are pale green at the lower, and dark brown at the higher part, are distinctly marked with lines, and have from thirty to forty long slender teeth. The catkins are two or three inches long, and have an immense number of scales arranged in whorls around them, the lower scales forming distinct rings.

This is not an uncommon though a somewhat local plant; and notwithstanding its name of Water Horsetail, it grows quite as often, or more so, on sandy or clayey moist soils, as on the borders of rivers or ponds, and in bogs, nor is it frequently, if ever, to be seen growing in the water. Its underground stem creeps far in the moist earth, where its black wiry roots increase rapidly, and are very abundant.

When this Horsetail grows in large masses, as it sometimes does in the neighbourhood of London, a third kind of stem is occasionally to be found in August, smaller and shorter than the ordinary stem, its sheaths less spreading, and its cone smaller. This is a dwarfed form of the plant, owing to the spot on which it occurs being not sufficiently moist for its luxuriant growth. This is also known as *E. maximum*.

8. **Variegated Rough Horsetail** (*E. variegátum*).—Stems trailing or erect; sheaths black at the top; teeth few, white, not falling off. This is one of the plants of the sea-shore, and one which, if it occurs in any quantity, proves valuable in binding down the loose sands. Its underground stem creeps for a long way just beneath the surface of the soil, and its root is formed of numerous whorls of fibres. It sometimes grows inland, on the banks of lakes, rivers, and in ditches, and under such circumstances becomes more luxuriant than on the sea-sands.

In this species the fertile and barren stems are alike; they are scarcely if at all branched, except at the base, but they have numerous branches just at the surface of the soil, or on the underground stem just below it. Occasionally the erect stems have a branch, very similar to the stem itself, arising from a joint here and there. The stems, which are about a foot high, are grooved, having from four to fourteen strong ridges. The sheaths, which are ribbed like the stems, are green below and black above, and their margins are fringed with black teeth of the same number as the ridges on the stem. These teeth have thin white edges and bristle-points.

The catkins are borne at the summit of some of these stems, and are small, black, and pointed, sometimes seated on the uppermost sheath, sometimes elevated on a short footstalk; they have very few scales.

One variety of this plant is by some writers considered a distinct species, and is called *E. arenárium*. It is small, slender, and trailing, and the stem has about six furrows. The *E. wilsóni* of some writers appears to be but another form of *E. variegátum*; it is much stouter, taller, and more erect in habit, being sometimes three feet high. The stems are usually without branches, but are sometimes slightly branched. They have about ten ridges, but are not very rough. The sheaths, which are scarcely larger than the stem, are green, with a black rim at the margin. The teeth are short and blunt, black, and edged with white, and the cone is small, black, and pointed.

The *E. variegátum* is abundant on sand hills, on parts of the Cheshire coast, at Wardrew in Northumberland, and elsewhere. It is found chiefly in the north, and several localities in Scotland, Wales, and Ireland are recorded as places of its growth.

9. **Mackay's Rough Horsetail, or Long-stemmed Horsetail** (*E. mackaii*).—Stem simple, or very slightly branched, rough; sheaths close; teeth slender, not falling off. This plant, which occurs in moist woods and mountain glens in Scotland, and in the north-east of Ireland, is a slender and almost unbranched species, the fertile and barren fronds being alike, save that the former bears a cone. The stems of the fronds arise from a branched rhizome, and are erect, and from two to four feet high. When they happen to be branched the branches are few, and are chiefly on the lower part of one or two of the side stems. The stem is deeply furrowed, having a double row of raised points along the edges, and the furrows vary from eight to fourteen in number. The sheaths, which clasp the stems very closely, are, like them, marked with lines, and terminate with the same number of teeth. These are very narrow, awl-shaped, black, with thin white margins, ultimately entirely white. The black oblong catkin has a little point at the top, and its scales are about thirty in number.

This plant was first discovered in 1833 by two botanists, Dr. Mackay and Mr. Whitla, in Colin Glen, near Belfast. It has since been found in the Den of Airly, in Forfarshire; and on the banks of the Dee, in Aberdeenshire; as well as at Calton Glen, in Antrim; and Ballyharrigan Glen, Londonderry. It is the *E. trachyodon* of Braun, and is regarded by Sir J. D. Hooker as merely a variety of *E. variegatum*.

THE END.

I. INDEX TO ORDERS AND GENERA

I. INDEX TO ORDERS AND GENERA.

	Vol.	Page
A.		
ACER	i.	150
Aceras	iii.	222
ACERINEÆ	i.	149
Achillea	ii.	194
Aconitum	i.	23
Acorus	iv.	21
ACOTYLEDONES	i.	7
,,	iv.	101
Actæa	i.	24
Actinocarpus	iv.	12
Adiantum	iv.	148
Adonis	i.	11
Adoxa	ii.	80
Ægopodium	ii.	49
Æthusa	ii.	56
Agrimonia	i.	240
Agrostemma	i.	115
Agrostis	iv.	67
Aira	iv.	69
Ajuga	iii.	45
Alchemilla	i.	241
Alisma	iv.	11
ALISMACEÆ	iv.	11
Allium	iii.	247
Allosorus	iv.	114
Alnus	iii.	148
Alopecurus	iv.	60
Althæa	i.	138
AMARANTHACEÆ	iii.	87
Amaranthus	iii.	87
AMARYLLIDEÆ	iii.	232
AMENTACEÆ	iii.	141
Ammophila	iv.	63
Anacharis	iii.	205
Anagallis	iii.	75
Anchusa	ii.	262
Andromeda	ii.	219
Anemone	i.	10
Angelica	ii.	61
Antennaria	ii.	168
Anthemis	ii.	190
Anthoxanthum	iv.	59
Anthriscus	ii.	73
Anthyllis	i.	194
Antirrhinum	iii.	19
Apargia	ii.	129
Apium	ii.	45
APOCYNEÆ	ii.	235
Aquilegia	i.	21
Arabis	i.	58
ARALIACEÆ	ii.	79
Arbutus	ii.	220
Arctium	ii.	146
Arctostaphylos	ii.	222
Arenaria	i.	123
Aristolochia	iii.	115
ARISTOLOCHIEÆ	iii.	115
Armeria	iii.	80
AROIDEÆ	iv.	16
Arrhenatherum	iv.	72
Artemisia	ii.	164
Arthrolobium	i.	207
Arum	iv.	17
Asarum	iii.	116
Asparagus	iii.	240
Asperugo	ii.	266
Asperula	ii.	111
Asplenium	iv.	130
Aster	ii.	175
Astragalus	i.	195
Athyrium	iv.	136
Atriplex	iii.	93
Atropa	ii.	272
Avena	iv.	88
Azalea	ii.	219
B.		
Ballota	iii.	46
BALSAMINEÆ	i.	161
Barbarea	i.	59
Bartsia	iii.	9
Bellis	ii.	184
BERBERIDEÆ	i.	26
Berberis	i.	26
Beta	iii.	89
Betonica	iii.	51

	Vol.	Page
Betula	iii.	144
Bidens	ii.	161
Blechnum	iv.	142
Blysmus	iv.	38
BORAGINEÆ	ii.	252
Borago	ii.	265
Borkhausia	ii.	136
Botrychium	iv.	156
Brachypodium	iv.	94
Brassica	i.	69
Briza	iv.	80
Bromus	iv.	85
Bryonia	ii.	16
Buffonia	i.	128
Bunium	ii.	50
Bupleurum	ii.	52
BUTOMACEÆ	iv.	10
Butomus	iv.	10
Buxus	iii.	123

C.

Cakile	i.	53
Calamagrostis	iv.	67
Calamintha	iii.	57
Callitriche	ii.	9
Calluna	ii.	217
Caltha	i.	20
CALYCIFLORÆ	i.	6
Calystegia	ii.	247
Camelina	i.	52
Campanula	ii.	197
CAMPANULACEÆ	ii.	197
CAPRIFOLIACEÆ	ii.	95
Capsella	i.	45
Cardamine	i.	56
Carduus	ii.	148
Carex	iv.	43
Carlina	ii.	156
Carpinus	iii.	193
Carum	ii.	49
CARYOPHYLLEÆ	i.	100
Castanea	iii.	180
Catabrosa	iv.	69
Caucalis	ii.	78
CELASTRINEÆ	i.	168
Centaurea	ii.	157
Centranthus	ii.	114
Centunculus	iii.	78
Cerastium	i.	125
CERATOPHYLLEÆ	ii.	10
Ceratophyllum	ii.	10
Ceterach	iv.	139
Chærophyllum	ii.	74
Cheiranthus	i.	66
Chelidonium	i.	38
CHENOPODIACEÆ	iii.	88
Chenopodium	iii.	90
Cherleria	i.	128
Chlora	ii.	243
Chrysanthemum	ii.	188
Chrysosplenium	ii.	36
Cicendia	ii.	241
Cichorium	ii.	143
Cicuta	ii.	44
Circæa	ii.	6
CISTINEÆ	i.	79
Cladium	iv.	38
Claytonia	ii.	18
Clematis	i.	9
Cnicus	ii.	149
Cochlearia	i.	48
Colchicum	iii.	256
Comarum	i.	230
COMPOSITÆ	ii.	122
CONIFERÆ	iii.	194
Conium	ii.	69
Convallaria	iii.	242
CONVOLVULACEÆ	ii.	246
Convolvulus	ii.	246
Corallorhiza	iii.	212
Coriandrum	ii.	68
CORNEÆ	ii.	87
Cornus	ii.	87
COROLLIFLORÆ	i.	7
Coronopus	i.	54
Corrigiola	ii.	19
Corydalis	i.	39
Corylus	iii.	190
Cotoneaster	i.	268
Cotyledon	ii.	21
Crambe	i.	53
CRASSULACEÆ	ii.	20
Cratægus	i.	262
Crepis	ii.	135
Crithmum	ii.	60
Crocus	iii.	230
CRUCIFERÆ	i.	41
CUCURBITACEÆ	ii.	15
Cuscuta	ii.	248
Cyclamen	iii.	73
Cynodon	iv.	98
Cynoglossum	ii.	267
Cynosurus	iv.	81
CYPERACEÆ	iv.	35
Cyperus	iv.	37
Cypripedium	iii.	225
Cystopteris	iv.	128

D.

Dactylis	iv.	81
Daphne	iii.	112
Datura	ii.	269
Daucus	ii.	75
Delphinium	i.	23
Dentaria	i.	56
Dianthus	i.	101
DICOTYLEDONES	i.	7
Digitalis	iii.	17

	Vol.	Page
Digitaria	iv.	99
DIOSCOREÆ	iii.	236
Diotis	iv.	163
DIPSACEÆ	ii.	117
Dipsacus	ii.	118
Doronicum	ii.	180
Draba	i.	50
Drosera	i.	88
DROSERACEÆ	i.	88
Dryas	i.	221
E.		
Echinophora	ii.	79
Echium	ii.	253
Elatine	i.	99
ELATINEÆ	i.	99
ELEAGNACEÆ	iii.	140
Eleocharis	iv.	39
Elymus	iv.	91
EMPETREÆ	iii.	116
Empetrum	iii.	117
Epilobium	ii.	1
Epimedium	i.	28
Epipactis	iii.	212
Epipogium	iii.	216
EQUISETACEÆ	iv.	169
Equisetum	iv.	169
Eranthis	i.	22
Erica	ii.	212
ERICACEÆ	ii.	211
Erigeron	ii.	174
ERIOCAULEÆ	iii.	257
Eriocaulon	iii.	258
Eriophorum	iv.	41
Erodium	i.	160
Eryngium	ii.	43
Erysimum	i.	64
Erythræa	ii.	241
Euonymus	i.	168
Eupatorium	ii.	167
Euphorbia	iii.	119
EUPHORBIACEÆ	iii.	117
Euphrasia	iii.	10
F.		
Fagus	iii.	177
Fedia	ii.	116
Festuca	iv.	82
Filago	ii.	171
FILICES	iv.	101
Fœniculum	ii.	57
Fragaria	i.	230
Frankenia	i.	97
FRANKENIACEÆ	i.	97
Fraxinus	ii.	232
Fritillaria	iii.	255
Fumaria	i.	40
FUMARIACEÆ	i.	39
G.		
Gagea	iii.	254
Galanthus	iii.	235
Galeobdolon	iii.	49
Galeopsis	iii.	47
Galinsoga	ii.	162
Galium	ii.	106
Gastridium	iv.	66
Genista	i.	176
Gentiana	ii.	238
GENTIANEÆ	ii.	238
GERANIACEÆ	i.	154
Geranium	i.	155
Geum	i.	223
Gladiolus	iii.	229
Glaucium	i.	31
Glaux	iii.	73
GLUMACEÆ	iv.	31
,,	iv.	35
Gnaphalium	ii.	169
Goodyera	iii.	216
GRAMINEÆ	iv.	35
,,	iv.	53
GROSSULARIEÆ	ii.	27
Gymnadenia	iii.	221
H.		
Habenaria	iii.	221
HALORAGEÆ	ii.	7
Hedera	ii.	81
Helianthemum	i.	80
Helleborus	i.	21
Helminthia	ii.	128
Helosciadium	ii.	48
Heracleum	ii.	66
Herminium	iii.	223
Herniaria	ii.	19
Hesperis	i.	76
Hieracium	ii.	139
Hierochloe	iv.	73
Hippocrepis	i.	207
Hippophaë	iii.	140
Hippuris	ii.	8
Holcus	iv.	71
Holosteum	i.	118
Honckenya	i.	122
Hordeum	iv.	92
Hottonia	iii.	67
Humulus	iii.	133
Hutchinsia	i.	46
HYDROCHARIDACEÆ	iii.	205
Hydrocharis	iii.	209
Hydrocotyle	ii.	42
HYMENOPHYLLACEÆ	iv.	108
Hymenophyllum	iv.	153
Hyoscyamus	ii.	270
HYPERICINEÆ	i.	143
Hypericum	i.	143
Hypochœris	ii.	130

	Vol.	Page
I.		
Iberis	i.	48
Ilex	ii.	226
ILICINEÆ	ii.	226
ILLECEBRACEÆ	ii.	18
Illecebrum	ii.	19
Impatiens	i.	161
Inula	ii.	181
IRIDEÆ	iii.	225
Iris	iii.	226
Isatis	i.	55
Isnardia	ii.	6
Isoetes	iv.	166
Isolepis	iv.	89
J.		
Jasione	ii.	205
Juncaceæ	iv.	1
JUNCAGINACEÆ	iv.	14
Juncus	iv.	2
Juniperus	iii.	198
K.		
Knappia	iv.	98
Knautia	ii.	121
Kobresia	iv.	43
Koeleria	iv.	73
Koniga	i.	53
L.		
LABIATÆ	iii.	28
Lactuca	ii.	130
Lagurus	iv.	65
Lamium	iii.	49
Lapsana	ii.	143
Lastrea	iv.	117
Lathræa	ii.	278
Lathyrus	i.	202
Lavatera	i.	137
Leersia	iv.	60
LEGUMINOSÆ	i.	172
Lemna	iv.	22
LEMNACEÆ	iv.	22
LENTIBULARIÆ	iii.	63
Leontodon	ii.	137
Leonurus	iii.	47
Lepidium	i.	47
Lepturus	iv.	97
Leucojum	iii.	236
Ligusticum	ii.	59
Ligustrum	ii.	231
LILIACEÆ	iii.	238
Limosella	iii.	24
Linaria	iii.	20
LINEÆ	i.	129
Linnæa	ii.	103
Linosyris		
Linum		
Liparis		
Listera		
Lithospermum		
Littorella		
Lloydia		
Lobelia		
LOBELIACEÆ		
Lolium		
Lonicera		
LORANTHEÆ		
Lotus		
Luzula		
Lychnis		
LYCOPODIACEÆ		
Lycopodium		
Lycopsis		
Lycopus		
Lysimachia		
LYTHRARIÆ		
Lythrum		
M.		
Maianthemum		
Malaxis		
Malva		
MALVACEÆ		
Marrubium		
MARSILIACEÆ		
Matricaria		
Matthiola		
Meconopsis		
Medicago		
Melampyrum		
MELANTHACEÆ		
Melica		
Melilotus		
Melittis		
Mentha		
Menyanthes		
Menziesia		
Mercurialis		
Mertensia		
Mespilus		
Meum		
Milium		
Mimulus		
Mœnchia		
Molinia		
Moneses		
Monochlamydeæ		
MONOCOTYLEDONES		
,,		
Monotropa		
MONOTROPEÆ		
Montia		
Mulgedium		
Muscari		

	Vol.	Page
Myosotis	ii.	258
Myosurus	i.	19
Myrica	iii.	143
Myriophyllum	ii.	8
Myrrhis	ii.	75

N.

NAIADACEÆ	iv.	24
Naias	iv.	30
Narcissus	iii.	233
Nardus	iv.	60
Narthecium	iv.	10
Nasturtium	i.	60
Neottia	iii.	215
Nepeta	iii.	54
Nuphar	i.	31
Nymphæa	i.	30
NYMPHÆACEÆ	i.	29

O.

Œnanthe	ii.	54
Œnothera	ii.	5
OLEACEÆ	ii.	230
ONAGRARIÆ	ii.	1
Onobrychis	i.	207
Ononis	i.	179
Onopordum	ii.	153
OPHIOGLOSSACEÆ	iv.	108
Ophioglossum	iv.	158
Ophrys	iii.	223
ORCHIDEÆ	iii.	210
Orchis	iii.	216
Origanum	iii.	42
Ornithogalum	iii.	252
Ornithopus	i.	206
OROBANCHEÆ	ii.	274
Orobanche	ii.	274
Orobus	i.	205
ORONTIACEÆ	iv.	21
Osmunda	iv.	154
OSMUNDACEÆ	iv.	108
OXALIDEÆ	i.	162
Oxalis	i.	163
Oxyria	iii.	111
Oxytropis	i.	195

P.

Pæonia	i.	25
PANICACEÆ	iv.	54
Panicum	iv.	74
Papaver	i.	33
PAPAVERACEÆ	i.	33
Parietaria	iii.	132
Paris	iii.	237
Parnassia	i.	149
Pastinaca	ii.	65
Pedicularis	iii.	15
Peplis	ii.	12
Petasites	ii.	172
Petroselinum	ii.	46
Peucedanum	ii.	63
Phalaris	iv.	62
Phleum	iv.	64
Phragmites	iv.	90
Physospermum	ii.	71
Phyteuma	ii.	205
Picris	ii.	129
Pilularia	iv.	168
Pimpinella	ii.	51
Pinguicula	iii.	63
Pinus	iii.	195
PLANTAGINEÆ	iii.	83
Plantago	iii.	83
PLUMBAGINEÆ	iii.	79
Poa	iv.	74
POACEÆ	iv.	55
POLEMONIACEÆ	ii.	245
Polemonium	ii.	245
Polycarpon	ii.	20
Polygala	i.	95
POLYGALEÆ	i.	94
Polygonatum	iii.	243
POLYGONEÆ	iii.	99
Polygonum	iii.	100
POLYPODIACEÆ	iv.	109
Polypodium	iv.	109
Polypogon	iv.	66
Polystichum	iv.	126
Populus	iii.	170
PORTULACEÆ	ii.	17
Potamogeton	iv.	24
Potentilla	i.	225
Poterium	i.	242
Primula	iii.	67
PRIMULACEÆ	iii.	66
Prunella	iii.	59
Prunus	i.	212
Pteris	iv.	143
Pulicaria	ii.	183
Pulmonaria	ii.	255
Pyrola	ii.	223
Pyrus	i.	252

Q.

Quercus	iii.	184

R.

Radiola	i.	133
RANUNCULACEÆ	i.	7
Ranunculus	i.	11
Raphanus	i.	77
Reseda	i.	78
RESEDACEÆ	i.	77

	Vol.	Page
RHAMNEÆ	i.	170
Rhamnus	i.	171
Rhinanthus	iii.	12
Rhynchospora	iv.	38
Ribes	ii.	28
Rosa	i.	243
ROSACEÆ	i.	209
Rubia	ii.	105
RUBIACEÆ	ii.	105
Rubus	i.	233
Rumex	iii.	107
Ruppia	iv.	28
Ruscus	iii.	241

S.

Sagina	i.	116
Sagittaria	iv.	18
Salicornia	iii.	96
Salix	iii.	150
Salsola	iii.	98
Salvia	iii.	31
Sambucus	ii.	96
Samolus	iii.	78
Sanguisorba	i.	242
Sanicula	ii.	21
SANTALACEÆ	iii.	114
Saponaria	i.	105
Sarothamnus	i.	177
Saussurea	ii.	147
Saxifraga	ii.	32
SAXIFRAGEÆ	ii.	31
Scabiosa	ii.	120
Scandix	ii.	73
Scheuchzeria	iv.	14
Schœnus	iv.	37
Scilla	iii.	250
Scirpus	iv.	40
SCLERANTHEÆ	iii.	98
Scleranthus	iii.	98
Scolopendrium	iv.	140
Scrophularia	iii.	15
SCROPHULARINEÆ	iii.	1
Scutellaria	iii.	60
Sedum	ii.	23
Sempervivum	ii.	21
Senecio	ii.	177
Serratula	ii.	147
Seseli	ii.	59
Sesleria	iv.	73
Setaria	iv.	74
Sherardia	ii.	113
Sibbaldia	i.	229
Sibthorpia	iii.	25
Silaus	ii.	60
Silene	i.	107
Simethis	iii.	246
Sinapis	i.	73
Sison	ii.	49
Sisymbrium	i.	62
Sisyrinchium	iii.	230
Sium	ii.	51
Smyrnium	ii.	71
Solanum	ii.	271
SOLANEÆ	ii.	268
Solidago	ii.	176
Sonchus	ii.	134
Sparganium	iv.	16
Spartina	iv.	98
Spergula	i.	118
Spiræa	i.	219
Stachys	iii.	52
Staphylea	i.	169
Statice	iii.	81
Stellaria	i.	119
Stipa	iv.	66
Stratiotes	iii.	209
Suæda	iii.	97
Subularia	i.	49
Symphytum	ii.	263

T.

TAMARISCINEÆ	ii.	12
Tamarix	ii.	13
Tamus	iii.	236
Tanacetum	ii.	163
Taxus	iii.	200
Teesdalia	i.	46
Teucrium	iii.	44
THALAMIFLORÆ	i.	7
Thalictrum	i.	10
Thesium	iii.	114
Thlaspi	i.	44
Thrincia	ii.	130
THYMELEÆ	iii.	112
Thymus	iii.	40
Tilia	i.	140
TILIACEÆ	i.	139
Tillæa	ii.	21
Tofieldia	iii.	257
Tordylium	ii.	67
Torilis	ii.	78
Tragopogon	ii.	127
Trichomanes	iv.	150
Trichonema	iii.	229
Trientalis	iii.	74
Trifolium	i.	184
Triglochin	iv.	14
Trigonella	i.	183
TRILLIACEÆ	iii.	237
Trinia	ii.	48
Triodia	iv.	80
Triticum	iv.	93
Trollius	i.	19
Tulipa	iii.	254
Turritis	i.	59
Tussilago	ii.	173
Typha	iv.	15
TYPHACEÆ	iv.	14

	Vol.	Page
U.		
Ulex	i.	174
Ulmaceæ	iii.	135
Ulmus	iii.	136
Umbelliferæ	ii.	37
Urtica	iii.	127
Urticaceæ	iii.	126
Utricularia	iii.	64
V.		
Vaccinieæ	ii.	207
Vaccinium	ii.	208
Valeriana	ii.	114
Valerianeæ	ii.	113
Verbascum	iii.	25
Verbena	iii.	61
Verbenaceæ	iii.	60
Veronica	iii.	2
Viburnum	ii.	99
Vicia	i.	197
Villarsia	ii.	244
Vinca	ii.	235
Viola	i.	82
Violaceæ	i.	82
Viscum	ii.	90
W.		
Wolffia	iv.	23
Woodsia	iv.	116
X.		
Xanthium	ii.	196
Z.		
Zannichellia	iv.	29
Zostera	iv.	29

II. GENERAL INDEX

II. GENERAL INDEX.

	Vol.	Page
A.		
Abele	iii.	170
Aconite, Winter	i.	22
Acorn, old uses of	iii.	186
dearth of, a national calamity	iii.	186
Acotyledons	i.	6
"	iv.	101
Adder's-meat	i.	120
Adder's-tongue, Common	iv.	158
Lesser	iv.	159
Agrimony	i.	240
Hemp	ii.	167
old medical repute of	i.	240
Alchemilla, old medical uses of	i.	241
Alder	iii.	148
glutinous nature of	iii.	149
medical uses of	iii.	149
economic uses of	iii.	150
Alderkars of our ancestors	iii.	149
Alexanders	ii.	71
use of, as a potherb	ii.	71
Alkanet, Common	ii.	262
Evergreen	ii.	263
economic uses of	ii.	262
Allseed	ii.	20
Alpine Fern, Rough	iv.	126
plants, remarks on	i.	222
lines alluding to, by Coleridge	i.	222
Alyssum, Sweet	i.	53
Amaranth	iii.	87
household uses of	iii.	88
Anacharis, introduction of, into our rivers	iii.	206
wonderful increase of	iii.	206
eaten by waterfowl	iii.	208
Andromeda	ii.	219
used in tanning	ii.	220
used in intoxicating liquors	ii.	220
Anemone, Blue Mountain	i.	12
Wood	i.	10
Yellow Wood	i.	12
Angelica	ii.	61
uses of	ii.	62
Apple, use of sour juice	i.	255
early culture by monks	i.	256
Drayton's account of	i.	256
medical and household uses	i.	258
Arbutus	ii.	220
Archangel, Wild	ii.	62
Yellow	iii.	49
Arctic Bramble	i.	238
Aromatic principle, remarks on the nature of	iii.	43
Arrow-grass, Mud	iv.	14
Sea	iv.	14
Arrowhead	iv.	13
nutritious tubers of	iv.	13
Arum, Common	iv.	17
Roman	iv.	20
Asarabacca	iii.	116
Ash	ii.	232
superstitions respecting	ii.	234
roots serve to drain moist lands	ii.	233
Asparagus	iii.	240
spots where found wild	iii.	240
use of, among the ancients	iii.	240
culture of, in old English gardens	iii.	241
Aspen	iii.	173
trembling of, referred to by poets	iii.	173
old tradition respecting wood of	iii.	174
old use of, by patten-makers	iii.	175
Asphodel, Bog	iv.	10
Scottish	iii.	257
Avens, Common, associated with old paintings and architecture	i.	224
Mountain, silken plumes of	i.	223

	Vol.	Page
Avens, Water	i.	225
clove-like scent of root of	i.	224
medical uses of	i.	225
Awlwort, Water	i.	49
Axil	i.	2
Azaleas, Trailing	ii.	219
B.		
Bald-money	ii.	60
Balm, Bastard	iii.	59
Balsam	i.	161
curious seed-vessel	i.	162
Baneberry	i.	24
poisonous nature	i.	24
Barberry	i.	26
irritability of stamens of	i.	27
medical uses of	i.	27
uses in dyeing and tanning	i.	27
Mildew, supposed effect on corn	i.	27
Barley, Meadow	iv.	92
Seaside	iv.	93
Wall	iv.	92
Wood	iv.	92
Barrenwort	i.	28
elasticity of anthers	i.	28
Bartsia, Alpine	iii.	9
Red	iii.	9
Yellow	iii.	9
disliked by cattle	iii.	10
root-parasite	iii.	10
Basil, or Basil-thyme	iii.	57
Wild	iii.	58
Bastard Balm	iii.	59
Stone-Parsley	ii.	49
Toad-flax, Erect	iii.	115
,, Lint-leaved	iii.	114
Beaked-Parsley, Common	ii.	74
Garden	ii.	73
Wild	ii.	73
Beak-rush, Brown	iv.	38
White	iv.	38
Beam, White	i.	263
Bean, ancient opinions of	i.	201
Bear-berry, Black	ii.	222
Red	ii.	222
fruits eaten	ii.	222
Beard-grass, Annual	iv.	66
Perennial	iv.	66
Bed-straw, Cross-leaved	ii.	109
Cross-wort	ii.	107
Great Hedge	ii.	109
Least Mountain	ii.	108
Rough-fruited	ii.	110
Rough Marsh	ii.	108
Smooth-fruited	ii.	110
Smooth Heath	ii.	107
Upright	ii.	108
Bed-straw, Wall	ii.	109
Warty-fruited	ii.	109
White Water	ii.	108
Yellow	ii.	106
good dye of	ii.	106
used as medicine for epilepsy	ii.	107
origin of name of	ii.	107
Beech	iii.	177
several interesting trees of	iii.	177
whether the Fagus of the Romans	iii.	178
various uses of fruits	iii.	179
uses of wood	iii.	179
uses of leaves	iii.	180
Beech Fern	iv.	110
Beet, Sea	iii.	89
use of, as an edible vegetable	iii.	89
Bell-flower, Clustered, old local name of	ii.	203
Corn	ii.	204
Creeping	ii.	202
Giant	ii.	201
Ivy-leaved	ii.	204
Nettle-leaved	ii.	203
Peach-leaved	ii.	198
Rampion	ii.	198
Round-leaved, the Harebell of poets	ii.	198
Spreading	ii.	197
lines on, by R. Nicols and Walter Scott	ii.	199
structure of corolla of	ii.	201
Bent-grass, Bristle-leaved	iv.	67
Brown	iv.	67
Dense-flowered	iv.	69
Fine	iv.	68
Fiorin	iv.	68
Marsh	iv.	68
Spreading Silky	iv.	68
Betony, Wood	iii.	51
medical properties of	iii.	51
old proverbs respecting	iii.	52
Bilberry	ii.	208
Great	ii.	209
Bindweed, Field	ii.	246
Great Hooded	ii.	247
Seaside	ii.	248
medical and economic uses of	ii.	247
Birch, Common	iii.	144
Dwarf	iii.	147
allusion of poets to	iii.	144
medical repute of	iii.	147
old usages with boughs of	iii.	148
various uses of bark of	iii.	146
Bird-cherry	i.	215
Bird's-eye Primrose	iii.	72
Bird's-foot	i.	206

	Vol.	Page
Bird's-foot Trefoil, Bristly	i.	194
Common	i.	193
Greater	i.	193
Slender	i.	194
Bird's-nest, Common	iii.	214
Yellow	ii.	225
not parasitic	ii.	225
Birthwort	iii.	115
Bishop's-weed	ii.	49
Bistort, Common	iii.	100
Viviparous	iii.	101
medical and economic uses of	iii.	100
used as food	iii.	101
Bitter-cress, Hairy	i.	58
Large-flowered	i.	56
Narrow-leaved	i.	57
irritable seed-pods	i.	58
Bitter-sweet	ii.	271
Bitter Vetch, Black	i.	206
Tuberous	i.	205
Blackberry, various old uses of	i.	235
lines on, by Elliott	i.	235
Blackthorn, early bloom alluded to by Graham	i.	213
leaves substituted for tea	i.	213
fruits used in adulterating wine	i.	214
astringent nature of fruits of	i.	213
juice used for marking ink	i.	214
Bladder-Campion	i.	108
remarkable fungi on	i.	108
Bladder-fern, Alpine	iv.	129
Brittle	iv.	128
Laciniated	iv.	129
Mountain	iv.	136
Bladder-nut	i.	169
Bladderseed, Cornish	ii.	71
Bladderwort, Greater	iii.	64
Intermediate	iii.	65
Lesser	iii.	65
singular structure of	iii.	65
Blinks	ii.	18
Blite, Annual Sea	iii.	97
Shrubby Sea	iii.	97
Blue-bell	iii.	250
Blue-bottle	ii.	159
Blue-eyed Grass	iii.	230
Blysmus, Broad-leaved	iv.	38
Narrow-leaved	iv.	38
Bog-Asphodel	iv.	10
not eaten by sheep	iv.	10
old uses of	iv.	10
Bog Myrtle	iii.	143
Bog Orchis	iii.	211
singular tubercles on leaves of	iii.	211
Bog-rush, Black	iv.	37
Borage	ii.	265
highly prized in old times	ii.	265
Borkhausia, Bristly	ii.	137
Smaller Rough	ii.	136
Stinking	ii.	136
Box	iii.	123
value of wood of	iii.	125
Bracken	iv.	143
Bracts	i.	3
Brake, Common	iv.	143
Rock	iv.	114
Bramble, Arctic	i.	238
Buckthorn-leaved	i.	236
Common	i.	235
Glandular	i.	237
Hard-leaved	i.	237
Hornbeam-leaved	i.	236
Stone	i.	238
Strawberry-leaved	i.	238
Upright	i.	236
uses of twigs	i.	236
lines on, by Elliott	i.	235
Bristle Fern	iv.	151
Bristle-grass, Glaucous	iv.	74
Green	iv.	74
Rough	iv.	74
Brome-grass, Barren	iv.	85
Corn	iv.	87
False	iv.	94
Great	iv.	86
Hairy	iv.	85
Smooth	iv.	87
Smooth Rye	iv.	86
Soft	iv.	87
Spreading	iv.	87
Taper Field	iv.	87
Tumid Field	iv.	86
Upright	iv.	85
Upright Annual	iv.	86
Brooklime	iii.	4
Brookweed	iii.	78
Broom	i.	177
economical uses of	i.	178
medical uses of	i.	178
originated the name of Plantagenet	i.	178
Broom-rape, Branched	ii.	277
Clove-scented	ii.	275
Greater	ii.	274
Ivy	ii.	277
Lesser	ii.	276
Picris	ii.	277
Purple	ii.	277
Red	ii.	276
Sand	ii.	277
Tall	ii.	276
culture of, in botanic gardens	ii.	278
parasitic nature of	ii.	274
sweet odour of Red	ii.	276

	Vol.	Page
Bryony, Red-berried	ii.	16
medical uses of	ii.	17
poisonous nature of	ii.	16
Bryony, Black	iii.	236
beauty of, in various seasons	iii.	236
old and modern medical uses of	iii.	237
poisonous properties of	iii.	237
Buck-bean	ii.	243
Flower of Liberty	ii.	244
medical and economical uses of	ii.	244
Buckler-fern, Broad	iv.	124
Crested	iv.	123
Heath	iv.	118
Marsh	iv.	117
Rigid	iv.	119
Buckthorn, Alder	i.	171
Common	i.	171
Sea	iii.	140
Buckwheat, Climbing	iii.	104
Common	iii.	102
Copse	iii.	104
early culture of	iii.	103
various uses of	iii.	103
Buffonia	i.	128
Bugle, Common	iii.	45
Pyramidal	iii.	46
Yellow	iii.	46
Bugloss, Common Viper's	ii.	253
Purple Viper's	ii.	255
Small	ii.	263
Bullace	i.	212
Bulrush, Common	iv.	40
Glaucous	iv.	40
Burdock	ii.	146
adhesive burs	ii.	146
Bur Marigold, Nodding	ii.	161
Trifid	ii.	162
singular structure of fruits of	ii.	161
Burnet	i.	242
fondness of cattle for	i.	242
Burnet Saxifrage, Common	ii.	51
Greater	ii.	51
use of, as cosmetic	ii.	51
Bur Parsley, Great	ii.	78
Small	ii.	78
Bur-reed	ii.	196
Branched	iv.	16
Floating	iv.	16
Unbranched	iv.	16
used to dye hair yellow	ii.	196
Butcher's-broom	iii.	241
peculiar appearance of flowers	iii.	241
various names of	iii.	241
Butter-bur	ii.	172
thought to cure the plague	ii.	173
Buttercup, Chervil-leaved	i.	18
Creeping	i.	17
Pale Hairy	i.	18
Buttercups, acridity of	i.	13
Butterwort, Alpine	iii.	64
Common	iii.	63
Large	iii.	64
Pale	iii.	64

C.

	Vol.	Page
Cabbage, Isle-of-Man	i.	71
Sea	i.	70
Calamint, Common	iii.	58
Lesser	iii.	57
Wood	iii.	58
household uses of	iii.	58
Calyx	i.	3
Campion, Bladder	i.	108
Moss	i.	107
Red	i.	115
Sea	i.	108
Stemless	i.	107
White	i.	114
Canary-grass, Common	iv.	62
Reed	iv.	62
Candy-tuft	i.	48
antiscorbutic properties of	i.	48
Canker-rose, allusion to, by Shakspere	i.	248
Caraway, Common	ii.	49
Tuberous	ii.	50
Whorled	ii.	50
valued in old times	ii.	49
Cardamine, the lady-smock of Shakspere	i.	57
use of, as salad	i.	57
Carline-Thistle	ii.	156
medical properties of	ii.	157
use of, as hygrometer	ii.	156
Carpenter's Herb	iii.	59
Carrot	ii.	75
Seaside	ii.	77
leaves worn instead of feathers	ii.	77
referred to by Drayton	ii.	77
Catch-fly, Common	i.	111
Corn	i.	110
English	i.	109
,, insect trap	i.	109
Italian	i.	110
Lobel's	i.	111
Night-flowering	i.	111
Nottingham	i.	109
Red Alpine	i.	114
Red German	i.	114
Sea	i.	108
Spanish	i.	108
Cat's-ear, Long-rooted	ii.	130

	Vol.	Page
Cat's-ear, Smooth	ii.	130
Spotted	ii.	130
Cat-Mint	iii.	54
fondness of cats for	iii.	54
medical properties of	iii.	54
old notion respecting the root of	iii.	54
Cat's-tail	iv.	15
Cat's-tail Grass, Alpine	iv.	64
Common	iv.	64
Michel's	iv.	65
Purple-stalked	iv.	65
Rough	iv.	65
Seaside	iv.	65
Celandine, Large, poisonous juice of	i.	38
old notion of use of, by swallows	i.	38
Lesser	i.	15
rejected by cattle	i.	16
uses of leaves	i.	16
Celery, Wild	ii.	45
noxious when growing near water	ii.	45
Centaury, Broad-leaved	ii.	242
Common	ii.	241
Dwarf-branched	ii.	242
Dwarf-tufted	ii.	242
medical properties of	ii.	242
Ceterach, Common	iv.	139
Chaffweed, Small	iii.	78
Chamomile, Common	ii.	190
Corn	ii.	192
Ox-eye	ii.	192
Sea	ii.	193
Stinking	ii.	193
medical properties of	ii.	191
formerly prized for its odour	ii.	191
Charlock	i.	73
Jointed	i.	77
Chequers	i.	259
Cherry, Morello	i.	219
Wild	i.	215
various uses of fruits of	i.	216
first planted in our orchards	i.	217
quotations from old English poets on	i.	217
annual feast of, at Hamburg	i.	218
Chervil	ii.	73
Broad-leaved	ii.	74
Rough	ii.	74
Tawny-fruited	ii.	74
Chestnut, Spanish or Sweet	iii.	180
use of fruits of, in various countries	iii.	182
names of places derived from	iii.	183
Chickweed, Common	i.	119
a cosmopolite	i.	119
Field	i.	127
Jagged	i.	119
Water	ii.	18
Wintergreen	iii.	74
Chicory	ii.	143
Cicely	ii.	75
old uses in cooking and medicine	ii.	75
Cinquefoil, Common	i.	228
Creeping	i.	227
Hoary	i.	226
Orange Alpine	i.	228
Purple Marsh	i.	230
Saw-leaved	i.	228
Shrubby	i.	226
Spring	i.	228
Strawberry-flowered	i.	226
Strawberry-leaved	i.	229
Three-toothed	i.	229
White	i.	229
Clary	iii.	31
Cleavers	ii.	110
filter made of stems of	ii.	110
seeds used for coffee	ii.	111
Clematis, Wild	i.	9
acrid juice	i.	9
leaf-stalks serving as tendrils	i.	9
seeds with feathery tails	i.	9
Cloudberry	i.	239
Clove, meaning of, in medieval deeds	i.	104
Clove Pink	i.	102
Gillyflower	i.	102
Clover, Crimson	i.	190
Dutch	i.	184
Purple	i.	187
Red	i.	187
Teasel-headed	i.	190
White	i.	184
Zig-zag	i.	189
seeds lying long dormant	i.	187
poetic associations of	i.	186
Club rush, Blunt-edged	iv.	41
Chocolate-headed	iv.	41
Least	iv.	41
Salt-marsh	iv.	41
Scaly-stalked	iv.	41
Sharp	iv.	40
Triangular	iv.	40
Wood	iv.	41
Club-moss, Common	iv.	159
Fir	iv.	165
Flat-stemmed	iv.	163
Interrupted	iv.	162
Marsh	iv.	164
Prickly	iv.	165
Savin-leaved	iv.	163

	Vol.	Page
Cockle of Scripture-writers	i.	116
Cock's-foot-grass, Rough	iv.	81
Cole-seed	i.	72
Colouring property of Madder, how discovered	ii.	106
Colt's-foot	ii.	173
vitality of rootstock	ii.	174
use of, in medicine	ii.	174
Columbine, Common	i.	22
Feathered (see Meadow Rue)	i.	10
lines on, by Browne	i.	22
dangerous properties	i.	23
Columna's Trichomena	iii.	229
Comfrey, Common	ii.	263
Tuberous	ii.	265
use of, as food for cows	ii.	264
Consciousness ascribed to vegetables	i.	165
lines on, by Wordsworth and W. S. Landor	i.	165
Convolvulus, Field	ii.	246
Hedge	ii.	247
Seaside	ii.	248
Coral-root	iii.	212
Gmelin's	iii.	216
leafless nature of	iii.	212
Cord-grass, Many-spiked	iv.	98
Twin-spiked	iv.	98
Coriander	ii.	68
ancient and modern use of	ii.	68
Cormeille of Highlanders	i.	206
Corn Blue-bottle, ancient legends of	ii.	159
lines on, by Clare	ii.	159
rich blue colour afforded by	ii.	159
Salad, reared in monastery gardens	ii.	116
Corn-Cockle	i.	115
Cornel	ii.	87
Dwarf	ii.	89
berries, oil of	ii.	88
Cornfield, flowers of, lines on by Longfellow	i.	115
Corn-flag	iii.	229
Cornish Bladderseed	ii.	71
Moneywort	iii.	25
Corn-salad, Carinated	ii.	116
Common	ii.	116
Hairy-headed	ii.	117
Sharp-fruited	ii.	117
Smooth-fruited	ii.	117
Corolla, forms of	i.	3
Corydalis, Solid-rooted	i.	39
White Climbing	i.	39
Yellow	i.	39
Cotoneaster	i.	268
Cotton-grass, Alpine	iv.	41
Cotton-grass, Broad-leaved	iv.	42
Hare's-tail	iv.	42
Narrow-leaved	iv.	42
Round-headed	iv.	42
Slender	iv.	42
Cotton Thistle	ii.	153
Cotton-weed	ii.	163
Couch-grass	iv.	94
Cowberry	ii.	210
Cow-bane	ii.	44
Parsnip	ii.	66
poisonous properties of	ii.	44
used for intoxication	ii.	66
Cow-wheat, Common Yellow	iii.	14
Crested	iii.	13
Lesser Yellow	iii.	14
Purple	iii.	13
liked by kine	iii.	14
root-parasites	iii.	14
Cowslip	iii.	71
used as cosmetic, as salad, and in wine	iii.	72
Crab	i.	255
Crakeberry	iii.	117
Cranberry	ii.	210
Crane's-bill, Bloody	i.	155
Blue Meadow	i.	156
Crowfoot	i.	156
Dove's-foot	i.	159
Dusky	i.	156
Jagged-leaved	i.	159
Knotted	i.	156
Long-stalked	i.	160
Mountain	i.	157
Round-leaved	i.	159
Shining	i.	157
Small-flowered	i.	159
Stinking	i.	158
Wood	i.	157
Creeping Jenny	iii.	75
Crocus, Golden	iii.	230
Least Purple	iii.	230
Naked-flowering	iii.	230
Purple Spring	iii.	230
Saffron	iii.	230
use of, in saffron	iii.	231
Crow-berry, uses of fruits	iii.	117
Crowfoot, Bulbous	i.	17
Celery-leaved	i.	16
Corn	i.	18
Creeping	i.	17
Ivy-leaved	i.	14
Meadow	i.	18
Mud	i.	14
Rigid-leaved Water	i.	14
River	i.	14
Small-flowered	i.	19
Three-lobed Water	i.	14
Water	i.	13
acridity of	i.	13

	Vol.	Page
Cruciform plants, wholesome nature of	i.	42
Cuckoo-buds of Shakspere	i.	17
Cuckoo-flower	i.	56
,,	i.	111
Cuckoo's-meat	i.	166
Cuckoo Pint	iv.	17
great heat evolved by spadix of	iv.	18
preparation of root as food	iv.	18
old medical use of	iv.	20
use of, for starch	iv.	20
Cudweed, Dwarf	ii.	171
Highland	ii.	170
Jersey	ii.	169
Marsh	ii.	171
Currant, Black	ii.	31
Red	ii.	30
Tasteless	ii.	31
uses of	ii.	30
Cut-grass	iv.	60
Cyclamen, singular coiled stalks of	iii.	73
Cyperus, Brown	iv.	37
False	iv.	51
Cyphel	i.	128

D.

Daffodil	iii.	233
Anglo-Saxon name of	iii.	233
early culture in gardens	iii.	233
admiration of, by old poets	iii.	234
injurious properties of	iii.	234
Daisy	ii.	184
early associations with	ii.	184
lines on, by Chaucer, Leyden, and Drayton	ii.	184
use of, in old devices	ii.	186
uses of, in medicine and charms	ii.	187
Damask Violet	i.	76
Dame's Violet	i.	76
Dandelion	ii.	137
uses of leaves for salad, and roots for coffee	ii.	138
medical uses	ii.	139
lines on, by Lowell	ii.	139
Danewort	ii.	99
Dead-nettle, Cut-leaved	iii.	50
Henbit	iii.	51
Intermediate	iii.	51
Red	iii.	50
economic uses of	iii.	50
White	iii.	49
Yellow	iii.	49
Deptford Pink	i.	101
Devil's-bit Scabious, old belief respecting	ii.	120
Dewberry	i.	237
lines alluding to, by Clare	i.	237
Dicotyledons	i.	6
Divining-rod still used in Cornwall	iii.	192
Dock, Alpine	iii.	107
formerly used for rhubarb	iii.	107
Bloody-veined	iii.	108
used as spinach	iii.	108
Broad-leaved	iii.	109
difficulty of eradication of	iii.	109
anecdote respecting, by Dr. Keith	iii.	109
Curled	iii.	107
used in cutaneous affections	iii.	107
Fiddle	iii.	108
Golden	iii.	110
Grainless Water	iii.	107
Great Water	iii.	107
Meadow	iii.	107
Sharp	iii.	108
Yellow Marsh	iii.	110
Dodder, Clover	ii.	252
Flax	ii.	249
Greater	ii.	248
Lesser	ii.	251
parasitic growth of	ii.	248
old opinion of medical uses of	ii.	251
Dog-nettle	iii.	48
Dog's-tail-grass, Crested	iv.	81
Rough	iv.	82
Dog's-tooth-Grass, Creeping	iv.	98
Dogwood	ii.	87
Dropwort	i.	221
Dropwort, Water	ii.	54
poisonous nature of	ii.	55
thought to be the poison of Socrates	ii.	56
Duckweed, Gibbous	iv.	23
Greater	iv.	23
Ivy-leaved	iv.	23
Lesser	iv.	22
Wolff's	iv.	23
mode of flowering described	iv.	22
Dutch Rush	iv.	172
Dwale	ii.	272
Dyer's Rocket, use of, in dyeing	i.	78
Dyer's-weed	i.	176
Dyer's Whin	i.	176

E.

Earth-nut	ii.	50
nutritious roots of	ii.	50
Eglantine of old poets	i.	246

	Vol.	Page
Elder, Common	ii.	96
Dwarf	ii.	99
lines referring to, by Clare	ii.	96
flower-buds used for capers	ii.	96
medical uses described by Evelyn	ii.	97
notion that Judas hanged himself on	ii.	98
Jew's ear fungus on	ii.	98
Elecampane	ii.	181
medical properties of	ii.	181
Ellhorn	ii.	98
Elm, Broad-leaved	iii.	139
Common	iii.	136
Wych	iii.	139
early flowering of	iii.	136
lines on, by Mant	iii.	137
uses of wood of	iii.	139
economic and medical uses of various parts of	iii.	138
Enchanter's Nightshade, Alpine	ii.	7
Common	ii.	6
reasons why so called	ii.	6
hooks on fruit	ii.	6
Eryngo, Field	ii.	44
Sea	ii.	43
Evening Primrose	ii.	5
uses of roots	ii.	6
Everlasting, Mountain	ii.	168
Pearly	ii.	169
used to deck graves	ii.	169
Eyebright, Common	iii.	10
use of, for eyes, alluded to by Milton, Drayton, Spenser, and Thomson	iii.	11
various opinions respecting	iii.	12

F.

False Brome-grass, Heath	iv.	95
Slender	iv.	94
Feather-grass	iv.	66
Featherfoil	iii.	67
Feathered Columbine	i.	10
Felwort	ii.	240
Fennel	ii.	57
Hog's	ii.	63
Water	i.	14
old household uses of	ii.	57
medical uses of	ii.	58
reference to uses of by ancients	ii.	59
Fenugreek	i.	183
Ferns	iv.	101
Bladder	iv.	128
Bristle	iv.	150
Buckler	iv.	117
Ferns, Filmy	iv.	153
Hard	iv.	142
Lady	iv.	136
Parsley	iv.	114
Polypody	iv.	109
Royal	iv.	154
Shield	iv.	126
Wood's	iv.	116
Fescue-grass, Barren	iv.	82
Meadow	iv.	84
Reed	iv.	83
Sheep's	iv.	83
Single-glumed	iv.	82
Tall	iv.	84
Tall-bearded	iv.	84
Feverfew	ii.	189
medical uses of	ii.	189
Figwort, Balm-leaved	iii.	17
Ehrhart's	iii.	17
Knotted	iii.	15
Water	iii.	16
Yellow	iii.	17
use of roots in famine	iii.	16
Filago, Common	ii.	172
Least	ii.	172
Narrow-leaved	ii.	171
Filbert, growth of	iii.	193
Filmy Fern, Scottis'	iv.	153
Tunbridge	iv.	153
Wilson's	iv.	153
Finger-grass, Hairy	iv.	99
Smooth	iv.	100
Fir, Scotch	iii.	195
in the Highlands	iii.	195
uses of	iii.	197
Flag, Corn	iii.	229
Purple	iii.	228
Sweet	iv.	21
Yellow	iii.	226
Flax, Cathartic	i.	132
Common	i.	130
Narrow-leaved	i.	130
Perennial	i.	130
culture of, in Britain	i.	131
original lines on, by M. I. Tomkins	i.	131
scriptural and other ancient allusions to	i.	130
various uses of	i.	132
Flax-seed	i.	133
Flea-bane, Alpine	ii.	175
Blue	ii.	175
Canada	ii.	174
Common	ii.	183
Common, supposed use of, by Patriarch Job	ii.	183
experiments on	ii.	183
Small	ii.	183
Fleawort, Field	ii.	180
Marsh	ii.	179

	Vol.	Page
Flixweed	i.	64
Flower-de-luce, ancient use of	iii.	228
beauty of seed-vessels of	iii.	229
old medical uses of	iii.	228
peculiarity of stigma of	iii.	229
Flowering Fern	iv.	154
Flowering Rush	iv.	10
old use of seeds and roots	iv.	10
peculiar structure of	iv.	10
Flowering Willow	ii.	1
Fluellin	iii.	23
Fool's Parsley	ii.	56
poisonous nature of	ii.	56
Forget-me-not, medical and economical uses of	ii.	260
lines on, by Mr. Noel	ii.	258
original lines on, by Mrs. Abdy	ii.	259
origin of name, as given by Mills	ii.	258
origin of name, according to Agnes Strickland	ii.	259
name universal in Europe	ii.	259
Foxglove	iii.	17
poisonous properties and medical uses of	iii.	18
Fox-tail Grass, Alpine	iv.	61
Floating	iv.	61
Meadow	iv.	60
Orange-spiked	iv.	62
Slender	iv.	61
Tuberous	iv.	61
Fritillary	iii.	255
origin of various names of	iii.	255
Frog-bit	iii.	209
Fruit, forms of	i.	5
Fumitory, Common	i.	41
Least-flowered	i.	41
Ramping	i.	40
Small-flowered	i.	41
lines alluding to, by Shakspere	i.	41
used as cosmetic	i.	41
why so called	i.	40
Furze, Common	i.	174
Dwarf	i.	176
admiration of Linnæus and Dillenius for	i.	175
original lines on, by M. I. Tomkins	i.	175

G.

Gagea, Yellow	iii.	254
Gale, Sweet	iii.	143
Galingale	iv.	37
Galinsoga, Small-flowered	ii.	162
Gang-flower	i.	95
Garlic, Babington's Great Round-headed	iii.	248
Garlic, Broad-leaved	iii.	249
Chive	iii.	249
Crow	iii.	249
Great Round-headed	iii.	247
Sand	iii.	248
Small Round-headed	iii.	249
Streaked Field	iii.	248
Triangular-stalked	iii.	249
old opinion of the medicinal virtues of	iii.	248
planted in monastery gardens	iii.	248
prized by ancient Egyptians	iii.	248
Gean	i.	215
Gentian, Alpine	ii.	240
Field	ii.	240
Marsh	ii.	238
Small-flowered	ii.	240
Spring	ii.	239
lines on, by Mant	ii.	239
medical properties of	ii.	239
Gentianella, Guernsey	ii.	241
Least	ii.	241
Germander, Annual	iii.	45
Wall	iii.	45
Water	iii.	45
Wood	iii.	44
Gilliflower, Clove	i.	102
Dame's	i.	77
Queen's	i.	77
Gipsywort, Common	iii.	30
Glasswort, Creeping	iii.	97
Jointed	iii.	96
formerly used in making glass	iii.	96
Globe-flower	i.	19
gathered for garlands	i.	19
Goat's-beard, Purple	ii.	128
Yellow	ii.	127
roots of, used as food	ii.	128
Golden-rod	ii.	176
formerly prized as a vulnerary	ii.	177
Golden Samphire	ii.	182
Gold of Pleasure, and its economic uses	i.	52
Goldylocks, Flax-leaved	ii.	168
Good King Henry	iii.	93
Goodyera, Creeping	iii.	216
Gool-ridings of Scotland	ii.	189
Gooseberry	ii.	28
early mention of	ii.	28
lines on, by Mant	ii.	28
culture of, by artisans	ii.	29
Goose-foot, Fig-leaved	iii.	92
Maple-leaved	iii.	92
Many-seeded	iii.	91
Mercury	iii.	93
Nettle-leaved	iii.	91

	Vol.	Page
Goose-foot, Oak-leaved	iii.	92
Red	iii.	92
Stinking	iii.	90
Upright	iii.	91
White	iii.	92
formerly boiled for Spinach	iii.	93
Goose-grass	ii.	110
Gout-weed	ii.	49
Grape Hyacinth	iii.	247
Grasses	iv.	31
„	iv.	53—100
Grass of Parnassus	i.	149
Grass-wrack	iv.	29
uses of	iv.	30
Green-weed	i.	176
Hairy	i.	177
Needle	i.	177
Gromwell, Common	ii.	256
Corn	ii.	256
Creeping	ii.	257
Smooth	ii.	257
Ground Ivy	iii.	55
galls on	iii.	56
medical properties of	iii.	55
old use of, in ale	iii.	55
Ground Pine, medical use of	iii.	46
Groundsel, Common	ii.	177
Mountain	ii.	178
Stinking	ii.	178
root worn as charm	ii.	177
Guelder Rose, Common	ii.	100
Mealy	ii.	99
Gymnogram, Fine-leaved	iv.	114

H.

Habenaria, Entire	iii.	222
Green	iii.	221
Small White	iii.	221
Hair-grass, Early	iv.	70
Grey	iv.	70
Silvery	iv.	70
Smooth	iv.	70
Tufted	iv.	69
Wavy	iv.	70
Hard Fern	iv.	142
Hard-grass, Sea	iv.	97
Hare's-ear, Common	ii.	52
Falcate-leaved	ii.	53
Narrow-leaved	ii.	52
Slender	ii.	53
Hare's-tail-grass, Ovate	iv.	65
Hart's-tongue	iv.	140
Hartwort, Great	ii.	68
Small	ii.	67
Hawk-bit, Autumnal	ii.	129
Rough	ii.	129
Hawk's-beard, Marsh	ii.	136
Hawk's-beard, Rough	ii.	136
Small	ii.	136
Smooth	ii.	135
Succory-leaved	ii.	136
Hawkweed, Alpine	ii.	141
Common Mouse-ear	ii.	140
Honey-wort	ii.	142
Narrow-leaved	ii.	142
Orange	ii.	140
Rough-bordered	ii.	142
Shrubby Broad-leaved	ii.	142
Wall	ii.	141
Wood	ii.	141
supposed to strengthen the sight	ii.	142
used by alchymists	ii.	140
Hawthorn	i.	263
allusions to by R. Nicols	i.	264
by Wordsworth	i.	265
lines on, by Spenser	i.	263
of Cawdor Castle	i.	266
of the "Deserted Village"	i.	265
of Glastonbury, superstition respecting	i.	266
original lines on, by Adams	i.	268
Hazel, Common	iii.	190
Wych	iii.	189
Hazel-tree in spring	iii.	190
in autumn	iii.	191
fruits and leaves of, found in bogs	iii.	191
names of places derived from	iii.	193
opinion of antiquaries on hazel-branches found in tombs	iii.	192
Heartsease	i.	87
Heath, Ciliated	ii.	212
Cornish	ii.	216
Cross-leaved	ii.	212
Fine-leaved	ii.	213
Irish	ii.	217
Mackay's	ii.	212
Mediterranean	ii.	217
St. Dabeoc's	ii.	218
economic uses of	ii.	214
lines on, by Leyden	ii.	216
most social of plants	ii.	213
old tradition of, respecting ale	ii.	215
Heather	ii.	217
Heath Fern	iv.	118
Heath-grass, Decumbent	iv.	80
Hedge-Mustard, Common	i.	62
Fine-leaved	i.	64
Hedge-Parsley, Knotted	ii.	79
Spreading	ii.	78
Upright	ii.	78
Hellebore, Green	i.	21

	Vol.	Page
Hellebore, Stinking	i.	21
early bloom of	i.	21
Mant's lines on	i.	21
Helleborine, Broad-leaved	iii.	212
Large White	iii.	213
Marsh	iii.	213
Narrow-leaved White	iii.	213
Purple	iii.	213
Hemlock	ii.	69
believed to be the Koneion of the ancients	ii.	70
poisonous nature of	ii.	70
Water	ii.	44
Hemp-Agrimony	ii.	167
medical uses of	ii.	168
Hemp-Nettle, Common	iii.	48
Downy	iii.	47
Large-flowered	iii.	48
Red	iii.	47
Henbane	ii.	270
poisonous nature of	ii.	271
Herb Christopher	i.	24
Herb of Grace	i.	10
Herb Paris	iii.	237
country names of	iii.	238
experiments on, by Gesner	iii.	238
poisonous nature of	iii.	238
singular structure of	iii.	238
Herb Robert	i.	158
medical properties of	i.	158
Herb Twopence	iii.	75
Hog's-fennel, Broad-leaved	ii.	64
Marsh	ii.	64
Sea	ii.	63
Holly	ii.	226
churches decked with	ii.	229
economic uses of	ii.	228
lines on, by Mant	ii.	227
superstitions respecting	ii.	228
Sea	ii.	43
Holly Fern	iv.	126
Holy-grass, Northern	iv.	73
Honewort	ii.	48
Honeysuckle, Common	ii.	101
Fly	ii.	103
Perfoliate	ii.	101
Hooded Bind-weed, medical properties of	ii.	247
Hop	iii.	133
first cultivated in this country	iii.	133
nature of narcotic principle	iii.	134
medical and economic uses	iii.	135
very early mention of	iii.	134
Horehound, Black	iii.	46
White	iii.	56
medical properties of	iii.	57
Hornbeam	iii.	193
Hornbeam, Gerarde's description of	iii.	193
old use of, in hedges	iii.	194
Horned Pondweed	iv.	29
Hornwort, Common	ii.	10
Unarmed	ii.	10
Horse-blob (see Marsh Marigold)	i.	20
Horseradish	i.	49
Horse-tail, Blunt-topped	iv.	176
Cornfield	iv.	169
Great	iv.	176
Long-stemmed	iv.	178
Mackay's Rough	iv.	178
Marsh	iv.	173
Rough	iv.	172
Shade	iv.	176
Smooth Naked	iv.	173
Variegated Rough	iv.	177
Water	iv.	173
Wood	iv.	174
Hound's-tongue, Common	ii.	267
Green-leaved	ii.	267
disagreeable odour of	ii.	267
Houseleek	ii.	21
considered a preservative from the effects of lightning	ii.	22
old medical uses of	ii.	22
referred to in lines by Leyden	ii.	22
Hutchinsia, Rock	i.	46
Hyacinth, Grape	iii.	247
Wild	iii.	250

I.

Inflorescence, forms of	i.	6
Insectivorous plants	i.	90
" "	i.	92
Inula, Willow-leaved	ii.	183
Iris, Stinking	iii.	228
Yellow	iii.	226
large size of seed-vessels of	iii.	226
mention of, in old works	iii.	228
use of seeds as coffee	iii.	227
use of roots for toothache	iii.	227
Isnardia	ii.	6
Ivy	ii.	81
hung at door of vintry	ii.	85
lines on, by Mant	ii.	84
old uses of	ii.	84
on buildings, effects of	ii.	81
on trunks of trees	ii.	82
use of, in garlands	ii.	85

J.

Jack-by-the-Hedge	i.	65
Jack-go-to-bed-at-noon	ii.	128

	Vol.	Page
Jacob's-ladder	ii.	245
- astringent property of	ii.	245
Juniper	iii.	198
old superstition connected with	iii.	199
uses of fruits of	iii.	196
K.		
Kecksies	ii.	69
Kidney-Vetch, medical and economical uses of	i.	194
Knappia, Early	iv.	98
Knapp's-grass	iv.	98
Knapweed, Black	ii.	158
Brown-rayed	ii.	157
Greater	ii.	158
Jersey	ii.	160
Knautia, Field	ii.	121
Knawel, Annual	iii.	98
Perennial	iii.	99
Knotgrass, Common	iii.	101
Robert's	iii.	102
Seaside	iii.	102
Whorled	ii.	19
fondness of sheep for	iii.	101
said to be good for silk-worms	iii.	102
Kobresia, Compound-headed	iv.	43
Koeleria, Crested	iv.	73
Koniga, Seaside	i.	53
L.		
Lady Fern	iv.	136
Lady-smocks	i.	56
Lady's-fingers	i.	194
Lady's Mantle, Alpine	i.	241
Common	i.	241
Field	i.	242
Lady's Slipper	iii.	225
Lady's-tresses, Drooping	iii.	215
Fragrant	iii.	215
Summer	iii.	215
Lamb's Lettuce	ii.	116
Larkspur	i.	23
Lavender, Sea	iii.	81
Leaves, forms of	i.	2
Leek, Wild	iii.	247
Lent Lily	iii.	233
Leopard's-bane, Great	ii.	180
Plantain-leaved	ii.	181
believed to be poisonous	ii.	180
Lettuce, Acrid	ii.	130
Ivy-leaved	ii.	133
Least	ii.	133
Prickly	ii.	132
Strong-scented	ii.	130
narcotic milky juice of	ii.	131
remarks on, by Christison and Duncan	ii.	131
Lily of the Valley	iii.	242
fondness of Hanoverians for	iii.	243
old medical use of flowers of	iii.	243
various old names of	iii.	243
Lime-tree, Broad-leaved	i.	142
Common	i.	140
Downy	i.	142
Small-leaved	i.	140
Linden-tree	i.	140
Ling	ii.	217
Linnæa, Two-flowered	ii.	103
given to Linnæus as crest	ii.	105
prized in Sweden	ii.	104
Linnean System	i.	1
Livelong	ii.	23
Lloydia, Mountain	iii.	254
Lobelia, Acrid	ii.	206
Water	ii.	207
noxious properties of	ii.	206
London Pride	ii.	32
Rocket	i.	63
Long Purples, lines by Clare alluding to	ii.	11
Loosestrife, Creeping	iii.	75
Great Yellow	iii.	74
Purple	ii.	11
Tufted	iii.	74
Wood	iii.	75
medical properties of	iii.	75
Lousewort, Marsh	iii.	15
Pasture	iii.	15
effect of on sheep	iii.	15
Lovage	ii.	59
eaten by Highlanders	ii.	59
Lucerne	i.	182
Lung-wort, Common	ii.	255
Narrow-leaved	ii.	256
Lyme-grass	iv.	92
Pendulous Sea	iv.	92
Upright	iv.	91
M		
Madder, Field	ii.	113
Wild, red dye of	ii.	105
Madwort, German	ii.	266
Maidenhair	iv.	148
White	iv.	133
Male Fern	iv.	120
Mallow, Common	i.	133
Dwarf	i.	136
Hispid	i.	139
Marsh	i.	138
Musk	i.	136
Tree	i.	137
medical properties of	i.	135
mentioned by Job	i.	136
tree, near Hyères	i.	137

	Vol.	Page
Mallow, Marsh	i.	138
singular old use of	i.	138
Maple, Common	i.	150
Greater	i.	152
variously tinted foliage	i.	150
wood used for mazers and dishes	i.	151
Mare's-tail	ii.	8
Marigold, Bur	ii.	161
Corn	ii.	189
Marsh	i.	20
Rooting	i.	21
Marjoram	iii.	42
medical and household uses of	iii.	43
Marsh Cinquefoil	i.	230
Fern	iv.	117
Isnardia	ii.	6
Marigold, acridity of	i.	20
Marshwort, Least	ii.	49
Procumbent	ii.	48
Masterwort	ii.	64
old and modern medical uses of	ii.	64
Mat-grass	iv.	60
May, old usages connected with	i.	263
lines on, by Chaucer and Spenser	i.	263
May Lily	iii.	243
Mayweed, Scentless	ii.	190
Stinking	ii.	193
Meadow-grass, Alpine	iv.	78
Annual	iv.	79
Borrer's Sea	iv.	76
Bulbous	iv.	78
Creeping	iv.	76
Dwarf Wheat	iv.	77
Flat-stemmed	iv.	77
Floating	iv.	75
Hard	iv.	77
Procumbent	iv.	76
Reed	iv.	74
Reflexed	iv.	76
Roughish	iv.	78
Smooth-stalked	iv.	77
Wavy	iv.	79
Wood	iv.	79
Meadow Rue, Alpine	i.	10
Lesser	i.	10
Yellow	i.	10
Meadow-sweet	i.	219
old medical uses of	i.	220
original lines on, by Mrs. Cox	i.	220
Meadow Saffron	iii.	256
peculiarity of ripening seeds of	iii.	256
fatal to animals	iii.	256
medicinal properties	iii.	257
Meadow Saffron, poisonous nature of	iii.	257
Medick, Black	i.	181
Bur	i.	181
Purple	i.	182
Spotted	i.	181
Toothed	i.	182
Yellow	i.	182
Medicks, singular seed-vessels of	i.	181
Medlar	i.	262
Melic-grass, Mountain	iv.	71
Wood	iv.	71
Melilot, Common Yellow	i.	182
Field	i.	183
White	i.	183
odour of	i.	183
medical use of	i.	183
Menziesia, Irish	ii.	218
Scottish	ii.	218
Mercury, Annual	iii.	118
Dog's	iii.	118
Perennial	iii.	118
Mertensia, Seaside	ii.	257
Meu	ii.	60
Mezereon	iii.	112
poisonous fruits of	iii.	113
medical and economic uses of	iii.	113
Michaelmas Daisy	ii.	175
leaves sold for Samphire	ii.	176
Mignonette, Wild	i.	78
original lines on, by Calder Campbell	i.	78
Milfoil, Common	ii.	8
Water	ii.	194
Woolly Yellow	ii.	196
Milk Parsley	ii.	64
Milk Thistle	ii.	134
,,	ii.	139
Milk Vetch, Alpine	i.	197
Purple	i.	197
Sweet	i.	195
Milkwort	i.	95
sub-species of	i.	97
Millet-grass, Spreading	iv.	65
Mint, Corn	iii.	39
Horse	iii.	38
Marsh	iii.	38
Narrow-leaved	iii.	39
Pepper-	iii.	37
Round-leaved	iii.	34
Spear-	iii.	34
Water	iii.	38
cultivation for drugs and perfumes	iii.	36
medical and culinary uses of	iii.	34
reference to, in New Testament	iii.	35

	Vol.	Page
Mistletoe	ii.	90
ancient and modern usages connected with	ii.	91
antiquity of use of at Christmas	ii.	94
Druidical superstitions respecting	ii.	91
medical properties of	ii.	92
mode of growth of	ii.	93
trees on which it grows	ii.	90
Mithridate Mustard	i.	44
confection	i.	44
Mœnchia, Upright	i.	117
Moneses, Large-flowered	ii.	223
Moneywort	iii.	75
Cornish	iii.	25
Monkey-flower, Yellow	iii.	24
Monk's-hood	i.	23
Monk's Rhubarb	iii.	107
Monocotyledons	i.	6
Moon Daisy	ii.	188
Moonwort, Chamomile-leaved	iv.	157
Common	iv.	156
Moor-grass, Blue	iv.	73
Moschatel	ii.	80
scent strongest at evening	ii.	80
original lines on, by F. A. Paley	iii.	47
Moss-Campion	i.	107
Mossy Cyphel	i.	128
Motherwort	iii.	47
medical uses of	iii.	47
Mountain Ash	i.	260
old and modern superstitions connected with	i.	261
uses of fruits of	i.	260
Mountain Avens, White	i.	221
Mountain Fern	iv.	118
Mouse-ear Chickweed, Alpine	i.	127
Broad-leaved	i.	126
Broad-leaved Alpine	i.	127
Common	i.	125
Four-cleft	i.	126
Five-stamened	i.	126
Stitchwort	i.	127
Water	i.	127
Mouse-tail	i.	19
Mud-rush, Bristle-stalked	iv.	39
Floating	iv.	39
Round Cluster-headed	iv.	40
Savi's	iv.	39
Mudwort, Common	iii.	24
Mugwort	ii.	164
medical properties of	ii.	165
old fancies respecting	ii.	164
Mullein, Dark	iii.	27
Great	iii.	25
Large-flowered	iii.	26
Moth	iii.	26
White	iii.	27
Mullein, Yellow Hoary	iii.	26
uses of	iii.	25
Mustard, Common	i.	74
Corn	i.	74
Hedge	i.	62
Mithridate	i.	44
Tower	i.	59
White	i.	74
Wild	i.	73
Mustard-seed, medical and economic uses of	i.	73

N.

	Vol.	Page
Naias, Flexible	iv.	30
Greater	iv.	30
Names of plants, Latin	i.	128
Narcissus, Pale	iii.	235
Poet's	iii.	234
emetic properties of	iii.	234
poetic legend of	iii.	235
Navew	i.	69
Nectary	i.	5
Nettle, Great	iii.	127
Roman	iii.	127
Camden's remarks on	iii.	127
Small	iii.	132
singular structure of sting of	iii.	127
various economic and medical uses of	iii.	129
value of, to insects	iii.	131
virulence of several species of	iii.	128
Nightshade, Black	ii.	272
Deadly	ii.	272
poisonous property and medical uses of	ii.	273
historic and poetic allusions to	ii.	273
Woody	ii.	271
Nipplewort, Common	ii.	143
Dwarf	ii.	143
Nit-grass, Awned	iv.	66
Nonsuch	i.	181
Noonday Flower	ii.	128

O.

	Vol.	Page
Oak	iii.	184
galls on, how caused	iii.	189
lines of Bernard Barton on	iii.	185
names of places derived from	iii.	187
old associations of	iii.	184
peculiar characteristics of	iii.	185
various interesting trees of	iii.	188

	Vol.	Page
Oak Fern	iv.	111
Oat, Bristle-pointed	iv.	88
Downy	iv.	89
Flat-stemmed	iv.	89
Narrow-leaved	iv.	89
Wild	iv.	88
Yellow	iv.	89
Oat-like grass	iv.	72
Old Man's Beard	i.	9
Onion, Rush-leaved	iii.	249
Sea, or Vernal Squill	iii.	252
Orache, Frosted Sea	iii.	94
Grass-leaved	iii.	96
Shrubby	iii.	93
Spreading Fruited	iii.	94
Halberd-leaved	iii.	94
Narrow-leaved	iii.	95
Stalked Sea	iii.	94
Triangular-leaved	iii.	95
old uses of	iii.	95
Orchis, Bee	iii.	223
Bog	iii.	211
Butterfly, Lesser	iii.	222
Great	iii.	222
Dwarf Dark-winged	iii.	218
Early Purple	iii.	216
Fen	iii.	212
Fly	iii.	224
Fragrant	iii.	221
Goodyer's	iii.	216
Great Brown-winged	iii.	218
Green Man	iii.	222
Musk	iii.	223
Winged	iii.	216
Habenaria	iii.	221
Lady's Slipper	iii.	225
Lax-flowered	iii.	219
Lizard	iii.	220
Marsh	iii.	219
Military	iii.	218
Monkey	iii.	219
Pyramidal	iii.	220
Spider	iii.	224
Late	iii.	223
Spotted	iii.	219
Orpine	ii.	23
old customs connected with	ii.	24
Osier, Common	iii.	160
Fine Basket	iii.	151
Golden	iii.	157
Green-leaved	iii.	152
Smith's	iii.	161
Stipuled	iii.	161
Osmund Royal	iv.	154
Ox-eye	ii.	188
acrid juice of	ii.	188
use of, against insects	ii.	188
Oxlip	iii.	71
Ox-tongue	ii.	128
Oxytropis, Hairy	i.	195
Yellowish	i.	195

P.

	Vol.	Page
Paigle	iii.	71
Panick-grass, Loose	iv.	74
Pansy, its old names and poetic associations	i.	88
Paris, Herb	iii.	237
Parsley, Bur	ii.	78
Common	ii.	46
Corn	ii.	48
Hedge	ii.	78
Beaked, Common	ii.	73
Garden	ii.	73
Wild	ii.	73
ancient uses of	ii.	47
Parsley Fern	iv.	114
Parsley Piert	i.	242
Parsnip	ii.	64
Cow	ii.	66
various economic uses of	ii.	65
Pasque-flower	i.	11
acridity of	i.	12
Easter eggs stained by its juice	i.	11
Pea, Broad-leaved Everlasting	i.	202
Narrow-leaved Everlasting	i.	202
Seaside Everlasting	i.	203
Legend of	i.	203
Pear	i.	252
several remarkable trees	i.	254
use of, for perry	i.	255
various old names and uses of	i.	254
Wardon, remarks on, by T. H. Turner	i.	253
Pearlwort, Annual	i.	117
Procumbent	i.	116
Sea	i.	117
Pellitory	iii.	132
old medical repute of	iii.	132
Penny-cress	i.	44
Alpine	i.	45
Perfoliate	i.	45
sheep fond of	i.	45
Penny-royal	iii.	39
Pennywort, Wall	ii.	21
Peony	i.	25
lines on, by Bowles	i.	25
Moutan, anecdote of	i.	26
old superstitions connected with	i.	25
Pepper-Saxifrage	ii.	60
fœtid nature of	ii.	60
Pepper-wort, Broad-leaved	i.	47
Field	i.	47
Hairy	i.	48

	Vol.	Page
Pepper-wort, Narrow-leaved	i.	47
formerly used to season dishes	i.	47
Perfoliate Penny-cress, fondness of sheep for	i.	45
Periwinkle, Greater	ii.	235
Lesser	ii.	236
medical properties of	ii.	237
referred to by Chaucer	ii.	237
Persicaria, Amphibious	iii.	104
Biting	iii.	106
Creeping	iii.	106
Lax-flowered	iii.	105
Pale-flowered	iii.	105
Slender-headed	iii.	105
Spotted	iii.	105
Highland superstition respecting	iii.	105
hindrance of, in draining land	iii.	104
pungent nature of	iii.	106
Petty-whin	i.	177
Pheasant's-eye, Corn	i.	12
Physic-garden, ancient, plants of	i.	63
Picris, Hawkweed	ii.	129
Pilewort	i.	15
Pillwort, Creeping	iv.	168
Pimpernel, Bastard	iii.	78
Bog	iii.	78
Scarlet	iii.	75
supposed barometer	iii.	76
medical properties of	iii.	77
Water	iii.	78
Pink, Cheddar	i.	105
Clove	i.	102
Deptford	i.	101
Maiden	i.	105
Mountain	i.	105
Proliferous	i.	102
Pipewort, Jointed	iii.	258
Pistil	i.	4
Plantain, Buck's-horn	iii.	86
Greater	iii.	83
Hoary	iii.	85
Ribwort	iii.	85
Sea-side	iii.	86
Water	iv.	11
Waybread	iii.	84
lines alluding to, by old and modern poets	iii.	84
medical uses of	iii.	84
Ribwort, worth of, on pasture lands	iii.	85
Ploughman's Spikenard	ii.	182
good oil furnished by	ii.	182
Plum	i.	212
Plume Thistles	ii.	149
Polypody, Alpine	iv.	115
Beech	iv.	110
Polypody, Common	iv.	109
Limestone	iv.	112
Oak	iv.	111
Pond-weed, Broad-leaved	iv.	24
Close-leaved	iv.	27
Curly	iv.	26
Fennel-leaved	iv.	28
Grass-wrack-like	iv.	27
Grassy	iv.	27
Griffith's	iv.	26
Hair-leaved	iv.	27
Horned	iv.	29
Lance-leaved	iv.	25
Lanceolate	iv.	25
Long-leaved	iv.	26
floating	iv.	25
Long-stalked	iv.	26
Oblong	iv.	25
Perfoliate	iv.	26
Plantain-leaved	iv.	25
Reddish	iv.	25
Sharp-leaved	iv.	27
Shining	iv.	26
Slender-leaved	iv.	28
Small	iv.	27
Various-leaved	iv.	25
uses of, to aquatic animals	iv.	24
Poplar, Black	iii.	175
Grey	iii.	172
Trembling	iii.	173
White	iii.	170
various uses of	iii.	172
Poppy, Common Red	i.	34
Long Rough-headed	i.	34
Long Smooth-headed	i.	34
Opium	i.	35
Round Rough-headed	i.	34
Scarlet Horned	i.	37
Violet Horned	i.	38
Yellow Horned	i.	36
Welsh	i.	36
flowers of cultivated lands	i.	33
Red, lines alluding to, by Agnes Strickland	i.	34
uses of seeds of	i.	35
White, narcotic properties of	i.	35
medical uses of	i.	36
Yellow Horned, old use of in incantations	i.	37
lines referring to, by Agnes Strickland	i.	37
Portland Sago, formerly made in Portland	iv.	17
Prickly Fern, Angular-lobed	iv.	127
Common	iv.	126
Prickly-toothed Fern, Broad	iv.	124
Common	iv.	126
Narrow	iv.	124
Soft	iv.	127

	Vol.	Page
Prickly-toothed Fern, Triangular	iv.	122
Primrose, Bird's-eye	iii.	72
Common	iii.	67
Scottish	iii.	72
lines on	iii.	68
by Mrs. Abdy	iii.	69
Privet	ii.	231
medical and economic uses of flowers and fruits of	ii.	231
Procession-flower	i.	95
Purple Loosestrife, Common	ii.	11
Hyssop-leaved	ii.	12
astringent property of	ii.	12
Purslane, Sea	i.	122
" "	iii.	93
Water	ii.	12

Q.

Quaking-grass, Common	iv.	80
Small	iv.	81
Quillwort, European	iv.	166
Porcupine	iv.	168

R.

Radish, Sea	i.	77
Wild	i.	77
Ragged Robin	i.	111
Ragwort, Broad-leaved	ii.	179
Common	ii.	178
Great Fen	ii.	179
Hoary	ii.	178
Inelegant	ii.	178
Marsh	ii.	179
use of, in medicine	ii.	179
Rampion, Round-headed	ii.	205
Spiked	ii.	205
Ramsons	iii.	249
medical use of	iii.	250
old proverb respecting	iii.	250
powerful odour of	iii.	250
Rape	i.	72
Raspberry	i.	233
Mountain	i.	238
Rattle, Hairy or Large Yellow	iii.	13
Yellow, parasitic nature of	iii.	12
Receptacle	i.	5
Recurved Fern	iv.	122
Red Rot	i.	90
Reed, Common	iv.	90
Small	iv.	67
Reed-mace, Great	iv.	15
Lesser	iv.	15
uses of pollen and down of	iv.	15
Rest-harrow, Common	i.	179
Small	i.	180
Rigid Fern	iv.	119
Rock-brake, Curled	iv.	114
Rock-cress	i.	58
Alpine	i.	58
Bristol	i.	59
Fringed	i.	58
Hairy	i.	58
Tower	i.	59
Rocket, Dyer's	i.	78
Sand	i.	76
Shrubby	i.	79
Wall	i.	76
singular growth of, after great fire of London	i.	63
Rock-rose, Common	i.	80
Hoary	i.	81
Ledum-leaved	i.	81
Spotted	i.	81
White	i.	81
Rogation-flower, old ceremonies connected with	i.	95
Root, forms of	i.	1
Rose, Burnet-leaved	i.	233
Cinnamon	i.	243
Dickson's	i.	243
Dog, Bracteated	i.	252
Close-styled	i.	252
Common	i.	247
Glaucous	i.	251
Trailing	i.	252
Downy-leaved	i.	245
Dwarf	i.	244
Irish	i.	244
Prickly Unexpanded	i.	244
Sabine's	i.	245
Slight-scented Briar	i.	246
Small-flowered Sweet Briar	i.	247
Small-leaved Sweet Briar	i.	247
True Sweet Briar	i.	245
Villous	i.	245
Wilson's	i.	244
allusions to, by historians and poets	i.	246
lines on, by E. B. Browning	i.	249
medical and economical uses of	i.	250
of Scripture writers	i.	249
original lines on, by Caroline White	i.	251
Rossolis	i.	89
Royal Fern	iv.	154
Runsh or Charlock	i.	74
Rupture-wort	ii.	19
Rush, Baltic	iv.	4
Black-headed	iv.	6
Black spiked	iv.	7
Blunt-flowered	iv.	6
Capitate	iv.	8
Clustered Alpine	iv.	7
Coast	iv.	4
Common	iv.	3

	Vol.	Page
Rush, Dense-headed	iv.	8
Dwarf	iv.	8
Flowering	iv.	10
Great Sharp Sea	iv.	5
Hard	iv.	4
Heath	iv.	7
Lesser Bog	iv.	6
Sharp Sea	iv.	5
Little Bulbous	iv.	6
Round-fruited	iv.	7
Sharp-flowered	iv.	5
Shining-fruited	iv.	6
Slender	iv.	4
Spreading	iv.	7
Soft	iv.	2
Thread	iv.	4
Three-flowered	iv.	8
Three-leaved	iv.	7
Toad	iv.	7
Two-flowered	iv.	8
Wood	iv.	8
Rushes	iv.	2
formerly spread in apartments	iv.	2
lines on, by Clare	iv.	6
by Crabb	iv.	7
old and present use of	iv.	2
use of, in paper-making	iv.	3
in cordage	iv.	4
in consolidating the soil	iv.	5
Rye-grass, Annual Flax	iv.	96
Bearded	iv.	95
Common	iv.	95

S.

Saffron Crocus	iii.	230
costliness of	iii.	232
narcotic properties of	iii.	231
old use of, in cookery	iii.	231
prescribed as medicine by old writers	iii.	231
used as a colouring agent	iii.	231
Meadow	iii.	256
Sage, Meadow	iii.	31
Wild	iii.	31
medical uses of	iii.	32
remarkable stamens	iii.	31
various household uses of	iii.	32
Wood	iii.	44
used instead of hops	iii.	44
Saintfoin	i.	207
economic and medical uses of	i.	207
St. John's Wort, Bearded	i.	148
Hairy	i.	147
Imperforate	i.	146
Large-flowered	i.	143
Linear-leaved	i.	148
Marsh	i.	148
Mountain	i.	147
St. John's Wort, Perforated	i.	144
Small Upright	i.	147
Square-stalked	i.	144
Trailing	i.	147
medical uses of	i.	144
uses of, on Midsummer-eve	i.	145
Salad Burnet, leaves formerly eaten	i.	242
planted for pasture	i.	242
Sallow, Dark-leaved	iii.	167
Ferruginous	iii.	162
Grey	iii.	166
Great Round-leaved	iii.	163
Long-leaved	iii.	162
Round-eared	iii.	166
Trailing	iii.	166
Sallow-thorn	iii.	140
Salsafy	ii.	128
Salt-wort	iii.	98
formerly grown for soda	iii.	98
Samphire	ii.	60
Golden	ii.	182
Prickly	ii.	79
gathering	ii.	61
lines referring to, by Agnes Strickland	ii.	61
use of, as pickle	ii.	61
Sand Rocket	i.	76
Sandwort, Alpine	i.	123
Bog	i.	125
Fine-leaved	i.	124
Fringed	i.	124
Level-topped	i.	124
Norwegian	i.	124
Purple	i.	124
Seaside	i.	124
Thyme-leaved	i.	123
Three-nerved	i.	123
Vernal	i.	123
Sanicle	ii.	43
deleterious nature of	ii.	43
Satin-flower	i.	120
Sauce-Alone	i.	65
Saussurea, Alpine	ii.	147
Saw-wort	ii.	147
Saxifrage, Alpine Brook	ii.	36
Alternate-leaved Golden	ii.	37
Burnet	ii.	51
Clustered Alpine	ii.	34
Common Golden	ii.	36
Drooping Bulbous	ii.	35
Geranium	ii.	36
Golden	ii.	36
Kidney-shaped	ii.	33
London Pride	ii.	32
Mossy	ii.	36
Mountain Meadow	ii.	59
Pepper	ii.	60
Purple Mountain	ii.	34

	Vol.	Page
Saxifrage, Rue-leaved	ii.	35
Starry	ii.	32
Tufted Alpine	ii.	36
White Meadow	ii.	35
Yellow Marsh	ii.	34
„ Mountain	ii.	34
Scabious, Devil's-bit	ii.	120
Small	ii.	121
Scheuchzeria, Marsh	iv.	14
Scorpion-grass	ii.	258
Creeping	ii.	258
Early Field	ii.	261
Field	ii.	261
Rock	ii.	261
Tufted	ii.	260
Upright	ii.	261
Yellow and Blue	ii.	262
Scotch Fir, beauty of Highland forests of	iii.	195
peculiar form of, on open wastes	iii.	196
uses of wood	iii.	197
Scottish Lovage	ii.	59
Scurvy-grass, Common	i.	48
Danish	i.	49
English	i.	49
medical uses of	i.	48
Sea-Blite, Annual	iii.	97
Shrubby	iii.	97
Sea-Buckthorn	iii.	140
berries eaten in various countries	iii.	141
anecdote of, by J. J. Rousseau	iii.	141
Sea-Heath, Powdery	i.	99
Smooth	i.	97
Sea-Holly	ii.	43
uses of roots and leaves	ii.	44
roots of, the "kissing comfits" of old writers	ii.	44
Sea-Kale, anecdote of Dr. Lettsom respecting	i.	53
Sea-Lavender, Remote-flowered	iii.	83
Spreading Spiked	iii.	83
Upright Spiked	iii.	83
retains its beauty long after gathering	iii.	83
Sea-Milkwort	iii.	73
Sea-Pink	iii.	80
Sea-Purslane	i.	122
Sea-Rocket, Purple	i.	53
Sea-Radish	i.	77
Sea Reed, Baltic	iv.	64
Common	iv.	63
Sea Ruppia	iv.	28
Sedge, Axillary-clustered	iv.	45
Black	iv.	47
Bœnninghausen's	iv.	45
Bracteated Marsh	iv.	46
Sedge, Close-headed Alpine	iv.	47
Common	iv.	47
Cord-rooted	iv.	48
Creeping Separate-headed	iv.	43
Curved	iv.	44
Distant spiked	iv.	45
Dwarf Capillary	iv.	50
Silvery	iv.	52
Elongated	iv.	44
Few-flowered	iv.	43
Fingered	iv.	52
Flea	iv.	43
Glaucous Heath	iv.	51
Great	iv.	45
Great Common	iv.	53
Panicled	iv.	45
Pendulous	iv.	50
Greater Prickly	iv.	46
Green-ribbed	iv.	49
Grey	iv.	46
Hairy	iv.	52
Hare's-foot	iv.	44
Hedge	iv.	51
Hoary	iv.	47
Large Downy-fruited	iv.	52
Lesser Common	iv.	53
Panicled	iv.	45
Little Prickly	iv.	44
Long Bracteate	iv.	48
Loose	iv.	49
Loose-flowered Alpine	iv.	50
Loose Pendulous	iv.	50
Mountain	iv.	51
Mud	iv.	50
Oval-spiked	iv.	44
Pale	iv.	48
Paradoxical	iv.	45
Pendulous Wood	iv.	50
Pink-leaved	iv.	49
Prickly Separate-headed	iv.	43
Rigid	iv.	47
Rock	iv.	43
Round-headed	iv.	51
Russet	iv.	48
Salt Marsh	iv.	49
Scorched, Alpine	iv.	50
Sea	iv.	46
Short Brown-spiked	iv.	50
Spiked Bladder	iv.	52
Slender-beaked Bottle	iv.	52
leaved	iv.	52
spiked	iv.	48
Smooth-stalked	iv.	49
Soft Brown	iv.	46
Starved Wood	iv.	50
Straight-leaved Water	iv.	47
Tawny	iv.	49
Three-nerved	iv.	47
Tufted Bog	iv.	48
Vernal	iv.	51

	Vol.	Page
Sedge, White	iv.	44
Yellow	iv.	48
Seed	i.	5
Self-heal	iii.	59
old use of, as vulnerary	iii.	59
Service, True	i.	259
Wild	i.	259
Setewall	ii.	114
Shamrock, Four-leaved, ancient superstition of	i.	186
whether wood-sorrel or clover	i.	185
Shave-grass	iv.	172
Sheep's-bit	ii.	205
Shepherd's-needle	ii.	73
Shepherd's Purse	i.	45
old medical use of	i.	46
universal growth of	i.	45
Shepherd's Staff	ii.	118
Sherardia, Blue	ii.	113
Shoreweed	iii.	87
Sibbaldia	i.	229
Sibthorpe's Money-wort	iii.	25
Sicklewort	iii.	59
Signatures, doctrine of	iii.	244
Silver-weed	i.	225
Simethis	iii.	246
discovery of	iii.	246
Skirret	ii.	52
Skull-cap, Common	iii.	60
Lesser	iii.	60
peculiar structure of calyx of	iii.	60
Sloe	i.	212
Smallage	ii.	45
Small-Reed, Narrow	iv.	67
Purple	iv.	67
Wood	iv.	67
Snake's-head	iii.	255
Snakeweed	iii.	100
Snapdragon, Great	iii.	20
Lesser	iii.	19
Snowdrop	iii.	235
old name of	iii.	235
Snowflakes, probably introduced from Germany	iii.	236
Snowflake, Spring	iii.	236
Summer	iii.	236
Soap of Scripture writers	i.	106
plant used for, by ancients	i.	106
Soapwort	i.	105
used in washing linen	i.	105
saponine contained by	i.	105
Soft-grass, Creeping	iv.	71
Meadow	iv.	72
Solomon's Seal, Angular	iii.	246
Common	iii.	244
Narrow-leaved	iii.	243
fancies respecting	iii.	244
remedy for bruises	iii.	246
Sorrel, Common	iii.	110
Mountain	iii.	111
Sheep's	iii.	111
Wood	i.	163
anti-scorbutic properties of	iii.	111
old use of, for verjuice	iii.	111
root affords dye	iii.	111
used in making bread in Sweden	iii.	111
Southernwood, Field	ii.	164
Sow-bread	iii.	73
Sow-thistle, Alpine Blue	ii.	133
Common Annual	ii.	134
Corn	ii.	134
Sharp-fringed Annual	ii.	135
Tall Marsh	ii.	134
properties of	ii.	135
Spearwort, Great	i.	15
Lesser	i.	15
Serpent's-tongue	i.	15
medicinal uses of	i.	15
Speedwell, Alpine	iii.	3
Blue Rock	iii.	3
Blunt-fingered	iii.	9
Brooklime	iii.	4
Buxbaum's	iii.	8
Common	iii.	5
Flesh-coloured	iii.	4
Germander	iii.	6
Green Procumbent Field	iii.	7
Ivy-leaved	iii.	7
Marsh	iii.	4
Mountain	iii.	5
Spiked	iii.	2
Thyme-leaved	iii.	3
Vernal	iii.	9
Wall	iii.	8
Water	iii.	4
lines alluding to, by Wordsworth	iii.	6
lines on, by Mant	iii.	8
medical uses of	iii.	5
original lines on, by Adams	iii.	6
use of, as tea	iii.	5
Spignel	ii.	60
Spike-rush, Creeping	iv.	39
Least	iv.	39
Many-stalked	iv.	39
Spindle-tree	i.	168
poisonous properties of	i.	169
use of, in dyeing	i.	169
various uses of	i.	169
Spiræa, Willow-leaved	i.	221
Spleenwort, Alternate-leaved	iv.	134
Black	iv.	131
Common Wall	iv.	136
Forked	iv.	134
Green	iv.	135

	Vol.	Page
Spleenwort, Green Lanceolate	iv.	130
Scaly	iv.	139
Sea	iv.	135
Smooth Rock	iv.	132
Wall Rue	iv.	133
Spring Beauty, Perfoliate	ii.	18
Sandwort	ii.	18
Spurge, Broad-leaved	iii.	120
Caper	iii.	122
Coral-like Hairy	iii.	120
Cypress	iii.	121
Dwarf	iii.	122
Irish	iii.	120
Leafy-branched	iii.	121
Marsh	iii.	120
Petty	iii.	122
Portland	iii.	122
Purple	iii.	119
Sea	iii.	121
Sun	iii.	119
Wood	iii.	123
acrid and dangerous properties of	iii.	121
medical uses of	iii.	120
Spurge Laurel	iii.	114
bark used as a stimulating application	iii.	114
Spurrey, Awl-shaped	i.	119
Corn	i.	118
Knotted	i.	119
Pearlwort	i.	119
cultivated in Holland	i.	118
sensitiveness of, to atmospheric changes	i.	118
Spur Valerian	ii.	114
Squill, Autumnal	iii.	252
Twin-leaved	iii.	252
Vernal	iii.	252
beauty of	iii.	252
Squinancy-wort	ii.	112
Stag's-horn Moss	iv.	159
Stamens	i.	4
Star-fruit	iv.	12
Star of Bethlehem, Common, or Eleven-o'clock-Lady	iii.	253
Drooping	iii.	253
Spiked	iii.	252
roots of, eaten	iii.	253
thought to be Dove's-dung of Scripture	iii.	253
Star of Jerusalem	ii.	128
Star Thistle, Common	ii.	160
Jersey	ii.	160
Yellow	ii.	161
Starwort, Water	ii.	8
Sea	ii.	175
Stems, forms of	i.	2
Stinking Chamomile, offensive odour of	ii.	193
medical properties of	ii.	193
Stipules	i.	3
Stitchwort, Bog	i.	122
Glaucous	i.	121
Greater	i.	120
Lesser	i.	121
Wood	i.	122
Stock, Great Sea	i.	69
Hoary Shrubby	i.	67
Stonecrop, Biting	ii.	26
Crooked	ii.	26
English	ii.	25
Hairy	ii.	25
Rose-root	ii.	24
St. Vincent's Rock	ii.	27
Tasteless Yellow	ii.	26
Thick-leaved	ii.	25
Welsh Rock	ii.	27
White	ii.	24
lines alluding to, by Clare	ii.	26
old medical repute of	ii.	26
Stork's-bill, Hemlock	i.	160
Musky	i.	160
Sea	i.	161
curious movements of seed-vessels of	i.	161
Strapwort, Sand	ii.	19
Strawberry, Hautboy	i.	232
Wood	i.	230
medical uses of	i.	230
anecdote of, by Hollinshed	i.	231
Strawberry-tree	ii.	220
lines on, by Mant	ii.	221
fruits of, eaten	ii.	221
Succory	ii.	143
cultivated for salad	ii.	145
numerous household uses of, in old times	ii.	145
probably one of the bitter herbs of the Israelites	ii.	145
roots mingled with coffee	ii.	145
Succulent plants, remarks on	ii.	26
tenacity of life of	ii.	26
Sulphur-weed	ii.	63
Sundew, Great	i.	94
Round-leaved	i.	88
Spathulate	i.	93
anecdote respecting, of young Swedish botanist	i.	94
insectivorous habits	i.	90
often unexpanded	i.	89
Sweet Alyssum	i.	53
Cicely	ii.	75
Flag	iv.	21
Sedge	iv.	21
old use of, in garlands	iv.	21
still strewed in Norwich Cathedral	iv.	21
uses of root	iv.	22
Sweet Briar	i.	245

	Vol.	Page
Sweet Gale	iii.	143
use in dyeing, and for household purposes	iii.	143
Sycamore	i.	152
Systems of Classification	i.	1

T.

Tamarisk	ii.	13
introduction of, into this country	ii.	13
mention of, by ancients	ii.	13
in Scripture	ii.	14
Manna derived from	ii.	15
Tansy	ii.	163
eaten at Easter	ii.	163
Tare, Hairy	i.	201
Slender	i.	202
economic uses of	i.	201
Tassel-grass	iv.	28
mode of flowering	iv.	28
Teasel, Fuller's	ii.	118
Small	ii.	119
Wild	ii.	118
old practices connected with	ii.	118
use of, in carding wool	ii.	119
Teesdalia, Naked-stalked	i.	46
Thale-cress	i.	58
Thistle, Carline	ii.	156
Common Cotton	ii.	153
Creeping Plume	ii.	150
Dwarf Plume	ii.	153
Marsh Plume	ii.	150
Meadow Plume	ii.	152
Melancholy Plume	ii.	152
Milk	ii.	149
Musk	ii.	148
Scotch	ii.	148
Spear Plume	ii.	149
Slender-flowered	ii.	148
Star	ii.	160
Stemless	ii.	153
Welted	ii.	148
Woolly-headed	ii.	152
great length of roots of	ii.	151
leaves and shoots used for food	ii.	149
original lineson, by Adams	ii.	155
ready dispersion of seeds of	ii.	149
Thorn-Apple	ii.	268
poisonous nature of	ii.	269
Thorow-wax	ii.	52
Thrift, Common	iii.	80
Matted	iii.	82
Plantain-leaved	iii.	81
Thrincia, Hairy	ii.	130
Thyme	iii.	40
economic and household uses of	iii.	41
Thyme, medical uses of	iii.	41
Tillæa, Mossy	ii.	21
Toad-flax, Bastard	iii.	114
Creeping Blue	ii.	23
Diffuse	iii.	24
Ivy-leaved	iii.	20
Least	iii.	24
Round-leaved	iii.	22
Sharp-pointed	iii.	22
Upright Purple	iii.	23
Yellow	iii.	23
anecdote of, respecting Linnæus	iii.	22
formerly used in poisonous preparations	iii.	21
medical properties of	iii.	23
Toothwort	ii.	278
parasitic nature of	ii.	279
Tormentil	i.	228
Tower Mustard	i.	59
Travellers' Joy	i.	9
Treacle-mustard, Garlic	i.	65
Hare's-ear	i.	65
Worm-seed	i.	64
Tree of the People	iii.	173
Trefoil, Bird's-foot	i.	193
Boccone's	i.	191
Hare's-foot	i.	189
Hop	i.	192
Lesser Yellow	i.	192
Reversed	i.	192
Rigid	i.	191
Slender Yellow	i.	193
Smooth Round-headed	i.	191
Soft-knotted	i.	190
Starry-headed	i.	190
Strawberry-headed	i.	192
Subterranean	i.	191
Suffocated	i.	191
Sulphur-coloured	i.	189
Teasel-headed	i.	190
Upright Round-headed	i.	191
Trichonema	iii.	229
Tulip, Wild	iii.	254
Tulipomania	iii.	254
Turnip, Common	i.	72
Tutsan	i.	143
Tway-blade, Common	iii.	214
Heart-leaved	iii.	214
Twig-rush, Prickly	iv.	38

V.

Valerian, Great	ii.	114
Greek	ii.	245
Heart-leaved	ii.	116
Small Marsh	ii.	114
the Spikenard of the ancients	ii.	115
Venus' Bath	ii.	118

	Vol.	Page
Vernal Grass, Sweet-scented	iv.	59
Veronica, origin of name of	iii.	3
Vervain	iii.	61
uses of, by Druids and Romans	iii.	61
old traditions of	iii.	61
alluded to by old poets	iii.	62
Vetch, Bitter	i.	205
Bush	i.	200
Common	i.	199
Hairy	i.	200
Horse-shoe	i.	207
Joint	i.	207
Rough-podded Purple	i.	199
Yellow	i.	200
Smooth-podded	i.	201
Yellow	i.	200
Spring	i.	199
Tufted	i.	198
Wood	i.	197
Wood Bitter	i.	199
uses of	i.	200
Vetchling, Blue Marsh	i.	204
Crimson	i.	205
Meadow	i.	202
Rough-podded	i.	205
Yellow	i.	205
Villarsia	ii.	244
Vine, Wild. See Clematis	i.	9
Violet, Cream-coloured	i.	87
Dog	i.	87
Hairy	i.	82
Marsh	i.	86
Pansy	i.	87
Peach-leaved	i.	87
Sand	i.	87
Sweet	i.	82
Wood	i.	86
Yellow Mountain	i.	88
dispersion of seeds of	i.	86
fertilization of	i.	83
in old gardens	i.	85
lines on, by Willis	i.	83
medical properties of	i.	84
poetic associations with	i.	82
Viper's Bugloss	ii.	253
great beauty of	ii.	254
Virgin's Bower	i.	9

W.

Wall-flower	i.	66
lines on, by Moir	i.	67
medical properties of	i.	67
Wall Pennywort	ii.	21
Wall Rocket	i.	76
Wall Rue	iv.	133
Wall Spleenwort	iv.	136
Wart-Cress	i.	54
Lesser	i.	54
former use of, for salad	i.	54
Water-blob. See Marsh Marigold	i.	20
Water-Cress	i.	60
iodine and sulphur in	i.	61
origin of common proverb	i.	61
use as salad, referred to by Herrick	i.	61
Water-Dropwort, Callous-fruited	ii.	54
Common	ii.	54
Fine-leaved	ii.	56
Hemlock	ii.	55
Parsley	ii.	54
River	ii.	56
Sulphur-wort	ii.	54
Water-Hemlock	ii.	44
Water-Lily, Great	i.	30
Least	i.	32
Yellow	i.	31
roots of, used to destroy crickets	i.	32
use of roots of, as food	i.	32
Cowper's lines on	i.	30
Noel's lines on	i.	31
useful in dyeing and tanning	i.	31
use of, in Japan and other countries	i.	31
Water-Milfoil, Alternate-flowered	ii.	9
Spiked	ii.	9
Whorled	ii.	8
Water-Parsnip, Broad-leaved	ii.	51
Narrow-leaved	ii.	52
Water-Pepper	iii.	106
Water-Plantain, Floating	iv.	12
Greater	iv.	11
Lesser	iv.	12
old medicinal uses of	iv.	12
Water-Purslane	ii.	11
Water-Radish	i.	62
Water-Soldier	iii.	209
rapid growth of	iii.	209
Water-Starwort, Autumnal	ii.	9
Pedunculated	ii.	9
Vernal	ii.	9
Water-Thyme	iii.	205
Water-Violet	iii.	67
Water-wort, Six-stamened	i.	99
Eight-stamened	i.	100
Way Bennet	iv.	92
Waybread	iii.	84
Wayfaring-tree, uses of	ii.	99
Weasel-snout, Yellow	iii.	49
Weld	i.	78
Wheat, Creeping	iv.	94
Crested	iv.	93
Fibrous-rooted	iv.	94
Rushy Sea	iv.	93
White Beam-tree	i.	263

	Vol.	Page
White-rot	ii.	42
deleterious properties of	ii.	42
Whitlow-grass, Rock	i.	51
Speedwell-leaved	i.	51
Twisted	i.	51
Vernal	i.	50
Yellow Alpine	i.	50
acridity of	i.	50
old presage respecting	i.	50
Whorl-grass, Water	iv.	69
Whortleberry	ii.	208
Bog	ii.	209
Marsh	ii.	210
Red	ii.	210
for jelly	ii.	208
lines on, by Coleridge and Nicholls	ii.	209
use of, in colouring wine	ii.	210
Wildenow's Fern	iv.	127
Willow, Ambiguous	iii.	159
Apple-leaved	iii.	169
Auricled-leaved	iii.	161
Blunt-stipuled	iii.	153
Brown	iii.	159
Common White	iii.	156
Crack	iii.	154
Cuspidate	iii.	154
Dark-leaved	iii.	167
Dark Long-leaved	iii.	158
Don's	iii.	159
Downy Mountain	iii.	160
Dwarf Silky	iii.	159
Goat	iii.	163
used as palm	iii.	163
Green Whortle-leaved	iii.	168
Grey	iii.	163
Intermediate	iii.	167
Least	iii.	169
smallest of British trees	iii.	169
Little Tree	iii.	158
Netted	iii.	160
Purple	iii.	150
Reticulated	iii.	160
Rose	iii.	151
Rosemary-leaved	iii.	158
Rusty-branched	iii.	159
Sadler's	iii.	170
Sand	iii.	160
Sharp-stipuled	iii.	153
Silky-leaved	iii.	161
Small Tree	iii.	168
Smith's	iii.	161
Smooth-leaved Alpine	iii.	168
Soft Shaggy	iii.	163
Stipuled	iii.	161
Sweet Bay-leaved	iii.	154
Tea-leaved	iii.	167
Woolly Broad-leaved	iii.	170
beauty of	iii.	170
Willow, Wrinkled	iii.	160
Yellow	iii.	157
Willow-herb, Alpine	ii.	5
Broad Smooth-leaved	ii.	4
Chickweed-leaved	ii.	4
Great Hairy	ii.	3
Narrow-leaved	ii.	4
Pale Smooth-leaved	ii.	4
Rose Bay	ii.	1
Small-flowered Hairy	ii.	3
Spear-leaved	ii.	4
Square-stalked	ii.	4
Willow-leaved Inula	ii.	183
Willow-thorn	iii.	140
Wilson's Fern	iv.	130
Winter Aconite	i.	22
Winter-cress	i.	59
Early	i.	60
Winter-green, Chickweed	iii.	74
Intermediate	ii.	224
Lesser	ii.	224
Round-leaved	ii.	223
Serrated	ii.	224
Woad, Dyers'	i.	55
use of, by ancient Britons and Anglo-Saxons	i.	55
used as dye instead of indigo	i.	55
Waxen, use of, in dyeing	i.	176
Woodbine, early leafing of	ii.	102
lines on	ii.	101
Wood-broom	ii.	118
Woodruff, Field	ii.	113
Small	ii.	112
Sweet	ii.	113
Wood-rush, Broad-leaved Hairy	iv.	8
Curved Mountain	iv.	9
Field	iv.	9
Great Hairy	iv.	8
Narrow-leaved	iv.	9
Spiked	iv.	9
Wood Sanicle	ii.	43
Woodsia, Alpine	iv.	116
Oblong	iv.	116
Ray's	iv.	116
Round-leaved	iv.	116
Wood-sorrel, Common	i.	163
Yellow	i.	167
dispersion of seed of	i.	167
oxalic acid in	i.	165
sensibility of	i.	163
Wormseed Treacle-mustard	i.	64
Wormwood, Common	ii.	165
Sea	ii.	167
uses of, in various liquors	ii.	166
Woundwort, Alpine	iii.	53
Corn	iii.	53
Downy	iii.	53
Hedge	iii.	52

	Vol.	Page
Woundwort, Marsh	iii.	52
Pale Annual	iii.	53
nutritive tubers of	iii.	53
repute of, as vulnerary	iii.	53
Wych Elm	iii.	139
Hazel	iii.	139

Y.

Yarrow, Common	ii.	194
Dotted-leaved	ii.	194
Sneeze-wort	ii.	194
Woolly Yellow	ii.	196
lines on, by Agnes Strickland	ii.	195
medical uses of	ii.	195
Yellow Cress, Amphibious	i.	62
Annual	i.	62
Yellow Cross, Creeping	i.	62
Yellow Weed	i.	78
Yellow-wort	ii.	243
Lister's experiments on	ii.	243
Yew	iii.	200
connection of, with churchyards	iii.	200
growth of, in old and present time	iii.	203
in Druidical worship	iii.	200
medical use of	iii.	204
opinions of Roger Ascham respecting	iii.	202
opinions respecting the wholesomeness of fruits	iii.	204
supposed fatal nature of	iii.	203
use of, in archery	iii.	202
various uses of the tree	iii.	204

Letterpress
PRINTED BY BILLING AND SONS
GUILDFORD

Coloured Plates
PRINTED BY J. M. KRONHEIM AND CO.
BANGOR HOUSE, LONDON

00055236

V 55236
582.130942
Pra/Flo.
Pratt, Anne.
The flowering plants,
grasses sedges & ferns of
Great Britain. V1.4. 18
DIGITIZED

Digitized with financial assistance from
Hemendra Kothari
on 06 November, 2019